







place signals at a considerable distance from the danger points that they cover; especially if, at another town on the same road and apparently near the top of one of those grades of 58 ft. to the mile, the home signals are not placed at an unusual distance from the fouling points, so that an engineman cannot go far beyond one of them without risk of an accident that might involve another train as well as his own, why should an allowance of 450 ft. for miscalculation be made at West Arlington?

If the derails take away the exceptional danger of the drawbridge and leave only the possibility of a non-fatal derailment in case a signal is overrun, so that a drawbridge provided with derails placed at an ample distance is no longer a more dangerous situation than any junction or similar point, why are bells to be placed on the distant signals?

C. C. ANTHONY.

#### New Freight Cars for the Mexican Central.

During the present year the Mexican Central has placed orders with the Michigan-Peninsular Car Co., of Detroit, Mich., for about one thousand freight cars, which are now being delivered, the order including box, coal and stock cars. These cars were designed by Mr. F. W. Johnstone, Superintendent of Motive Power and Machinery of the Mexican Central, and the construction is shown in detail by the accompanying engravings.

The following table gives the general dimensions of these cars:

Dimension.	Box car.	Coal car.	Stock car.
	Ft. In.	Ft. In.	Ft. In.
Center drawbar above top of rail.....	2 10 $\frac{1}{2}$	2 10 $\frac{1}{2}$	2 10 $\frac{1}{2}$
Length outside of sills.....	34 0	34 0	34 0
Width.....	8 9	8 10	8 9
Width of door opening in the clear.....	5 2	5 1	5 1
Height.....	6 6 $\frac{1}{4}$	7 2 $\frac{1}{4}$	7 2 $\frac{1}{4}$
Height from bottom of sill to top of running board.....	8 8 $\frac{1}{2}$	9 3 $\frac{1}{2}$	9 3 $\frac{1}{2}$
Height of sides.....	3 8	.....	.....
From outside of end sills to center of transoms.....	4 9	4 9 $\frac{1}{2}$	4 9 $\frac{1}{2}$
Distance between center sills.....	0 9 $\frac{1}{2}$	0 9 $\frac{1}{2}$	0 9 $\frac{1}{2}$
Distance between side and intermediate sills.....	1 8 $\frac{1}{2}$	0 9 $\frac{1}{2}$	1 8 $\frac{1}{2}$
Distance between intermediate and center sills.....	1 1 $\frac{1}{2}$	0 9 $\frac{1}{2}$	1 1 $\frac{1}{2}$
Distance between center of transoms.....	24 6	24 4 $\frac{1}{4}$	24 4 $\frac{1}{4}$
Distance between center of needle beams.....	8 0	8 0	8 0
Spread of trucks.....	5 2	5 2	5 2
Diameter of wheels.....	33	33	33
Journals.....	4 $\frac{1}{4}$ x 8	4 $\frac{1}{4}$ x 8	4 $\frac{1}{4}$ x 8

**Box Car.**—Figs 1 to 3, inclusive, show the standard 60,000 lbs. capacity box car. The side, center and intermediate sills are of Southern long-leaf yellow pine, 4 $\frac{1}{4}$  in. x 9 in. x 33 ft. 3 in. long over all. On the under side of the center sills are white oak sub-sills 3 in. x 4 $\frac{1}{4}$  in. which form a continuation of the draft timbers, and are cut to fit between the draft timbers and cross-tie timbers. The sub-sills are fastened to the center sills by  $\frac{3}{8}$ -in. bolts. All the sills are gained on the under side to throw the cross-frame tie timbers at an angle of seven degrees to a perpendicular, as shown by Fig. 1. The end sills are of white oak, 6 in. x 9 in. x 8 ft. 9 in., mortised to receive the longitudinal sills and are held in place by four truss rods and corner irons. The cross frame tie timbers are white oak, 5 in. x 10 in. x 8 ft. 9 in., placed 8 ft. center to center, and gained  $\frac{1}{2}$  in. deep for each sill, to which they are joined by  $\frac{3}{8}$ -in. bolts. Openings are cut in these timbers to allow the continuous draw rods to pass through them.

The draft gear shown in Fig. 3 is the American con-

8 in. x 2 ft. 6  $\frac{1}{8}$  in., bolted to the inside of the draft timbers. The deadwoods are white oak blocks, 5 in. x 8 in. x 24 in., protected on the face and under side by angle irons. The couplers are steel furnished by the American Steel Works Co., of St. Louis, and are attached by means of a wrought-iron tail bolt 2 in. in diameter by 7 in. long. The continuous rods are 1 $\frac{1}{2}$  in. in

and the ends of the lower bar are straight, with a bearing 3 in. long on the upper bar. Between the upper and lower bars of the body bolster is a malleable iron filling piece extending from the draft timbers to the outer edge of the side bearing, and a second malleable-iron filler is placed between the draft timbers, through which the center pin passes. The parts are bolted together, as

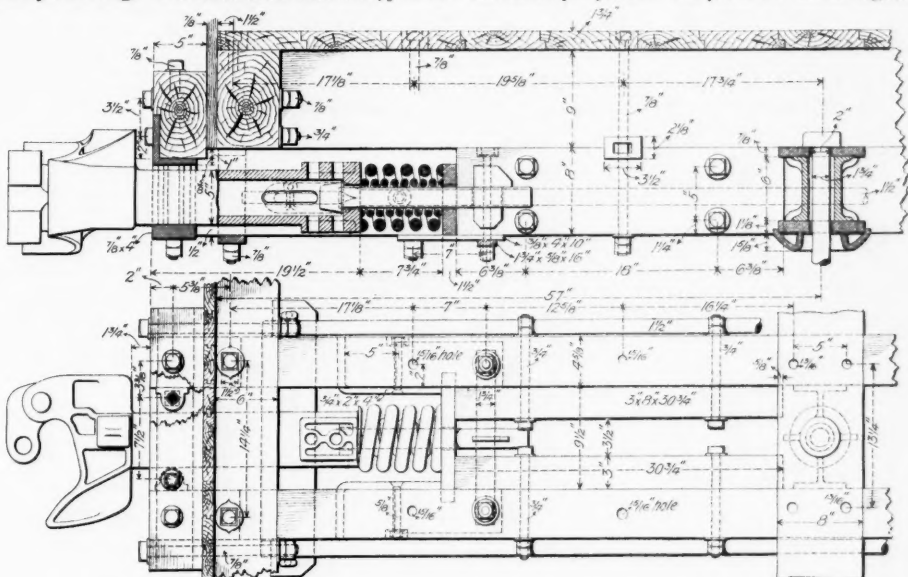
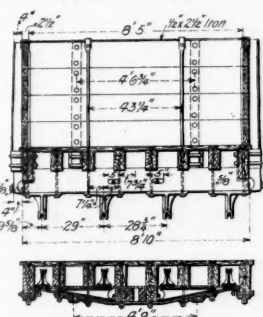


Fig. 3.—Draft Rigging for Standard Box Car of 60,000-lbs Capacity—Mexican Central Railway.

diameter, the follower plate carrying irons are  $\frac{3}{8}$  in. x 4 in. x 10 in., the draft lug straps  $\frac{3}{8}$  in. x 1 $\frac{1}{4}$  in. x 16 in. and the carrier irons  $\frac{3}{8}$  in. x 4 in. x 18 $\frac{1}{2}$  in.; all of these parts are of wrought iron. The drawbar springs are double coils of 1 $\frac{1}{4}$  in. and  $\frac{3}{4}$  in. diameter round cast steel, the outside diameter of the coil being 6 $\frac{1}{4}$  in. and the length 8 in. when not loaded. The springs are



Cross-Section of Mexican Central Coal Car.

6 in. high when solid, 7 $\frac{1}{4}$  in. high with 7,000 lbs. load, and close under a load of 19,000 lbs.

The car is trussed with four 1 $\frac{1}{2}$ -in. wrought-iron rods upset at the ends to 1 $\frac{3}{4}$  in., which pass through the end sills, and are carried over the body bolsters on cast-iron saddles and under the cross-frame tie timbers on cast-iron queen posts. The ends of the rods are fitted with square nuts.

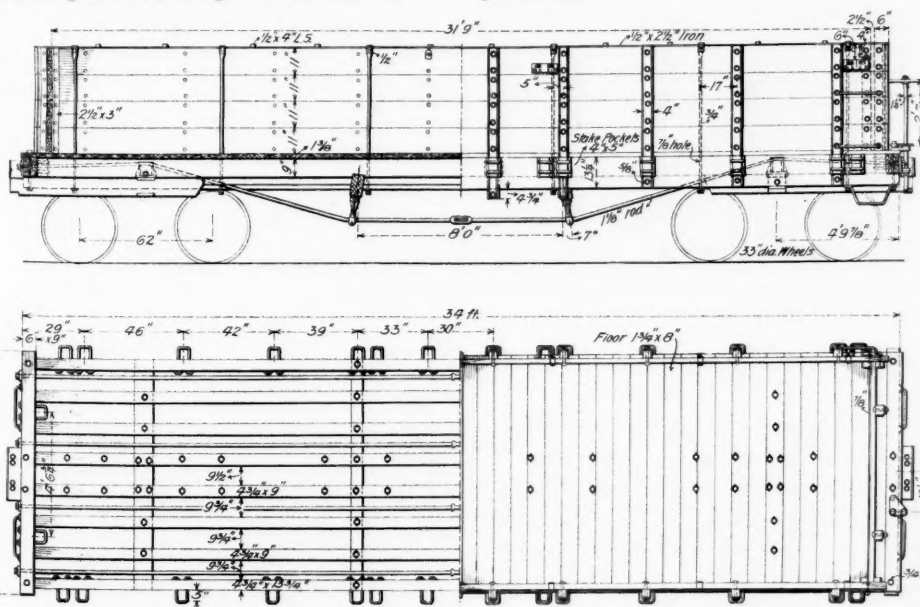


Fig. 4.—Coal Car of 62,000-lbs. Capacity—Mexican Central Railway.

tinuous rig and the standard of the Mexican Central. The draft timbers are white oak, 4 $\frac{1}{4}$  in. x 8 in. x 7 ft. 6 in., bolted to the center and end sills, the bolster and deadwood. The draft timbers are further prevented from slipping by two malleable-iron keys let half-way into the top of the draft timbers and the bottom of the center sills, and also by the sub-sills before mentioned. The drawbar stops consist of two pieces of oak, 3 in. x

As shown by Fig. 2, the body bolster is built up of iron bars 8 in. wide, having a tensile strength of from 50,000 to 55,000 lbs. per sq. in. The upper bar is 1 in. and the lower bar 1 in. thick. The upper bar is straight and has the ends turned over 5 $\frac{1}{2}$  in. long and welded, while the lower bar is shaped, as shown in the engraving, with a set of 6 in. at the center; the lower bar is parallel to the upper for 12 in. either side of the center,

shown in Fig. 2. The side bearings are cast iron and the center plate is pressed steel.

The Mexican Central standard four-wheel rigid trucks are used, which were described in the *Railroad Gazette* June 4, last. The cars are equipped with Westinghouse automatic quick-action air brakes and there is also a hand brake at one end. The trucks are fitted with Player brakebeams. The posts, braces, girths, carlines and end plates of the car body are white oak, while the side plates, ridge pole, running board and siding are yellow pine. The flooring is yellow pine 1 $\frac{1}{4}$  in. thick and varying in width from 6 to 8 in. The lining is  $\frac{3}{4}$  in. x 5 $\frac{1}{2}$  in. yellow pine.

**Coal Car.**—The construction of the under frame of the standard 62,000-lbs. capacity coal car, Fig. 4, is similar to that of the box car previously described, excepting the side sills of the coal car are 13 $\frac{1}{2}$  in. deep and 34 ft. long, and four intermediate sills are used. The same style of draft-rigging couplers, brakes and trucks are used. The body bolsters of the coal car have the ends of the upper bar turned down and out to fit the inside and bottom of the side sills, as shown in Fig. 4, otherwise the construction is the same as used with the box cars.

The stake pockets are cast iron and secured to the side and end sills by two strap bolts each. Cast-iron stake brackets are placed at the bottom end of the four center stakes and take the thrust of the stakes, due to outward pressure on the sides when the car is loaded. Twenty-four oak stakes are used for each car, the tops of which are protected by  $\frac{1}{2}$  in. x 2 $\frac{1}{2}$  in. iron strips. Each of the car sides is formed of four pieces of yellow pine 2 $\frac{1}{2}$  in. x 11 in. x 33 ft. 3 in. long secured to the stakes by two  $\frac{1}{2}$  in. x 8 in. carriage bolts at each crossing.

The car ends are formed of four pieces 8 ft. 5 in. long, similar to the sides, which are held in place by two stakes at either end and by cleats bolted to the sides, as shown in the engravings. The sides and ends are further secured to the body of the car by six strap bolts on each side and two on each end.

**Stock Car.**—Fig. 5 shows the standard 34-ft. stock car. The under frame, draft-rigging, couplers, body bolsters, trucks and brakes are the same as described for the box car. The posts and braces are white oak and the slats are 1 in. x 5 $\frac{1}{2}$  in. yellow pine secured to the posts by one  $\frac{1}{2}$ -in. carriage bolt and two 2 $\frac{1}{2}$ -in. wire nails at each crossing. There are two slats, each 12 in. wide, placed 26 in. from the floor. The car has a door on each side 5 ft. 1 $\frac{1}{4}$  in. wide x 7 ft. 5 in. high and a lower door at each end 2 ft. 2 $\frac{1}{2}$  in. high x 5 ft. 6 $\frac{1}{4}$  in. wide at the top and 6 ft. 3 $\frac{1}{4}$  in. wide at the bottom; also, an upper door at either end 2 ft. 6 in. wide by 3 ft. 1 in. high. All the doors are made of oak.

#### The Allen-Morrison Composition Brake Shoe.

In our issue of Aug. 27 we described the Allen-Morrison composition brake shoe, adopted by the South Side Elevated Railroad (Alley L), Chicago, and gave results from a service test with car No. 24, but, as was then explained, the shoes were not worn out, hence the test was not complete at time. We will not repeat what was published, in the issue referred to, regarding the service on the road, the action of shoes, or their effect on the wheel. It might be said, however, that nothing developed during the latter part of this test to necessitate modifying any of the statements previously made.

Car No. 24 was fitted with the new composition brake shoes on May 20, and on Sept. 9 they were taken off and examined. Four shoes were found to be worn sufficiently to warrant their removal; the remaining four were replaced and were not removed until Sept. 24. The brake shoes removed Sept. 9 made 21,011 miles, and the



average loss in weight was between 11 and 11½ lbs. for each shoe. The four shoes on this car removed Sept. 24 made a mileage of 23,373 and the loss in weight was 12½ lbs. each; the thickness of these shoes was reduced 1¼ in., and, as near as could be measured with the instruments at hand, the diameter of the wheel at the end of this test showed a reduction of ¼ in.

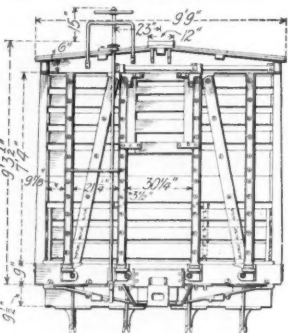
It is interesting to compare this record with that obtained from other brake shoes on the same road and under the same conditions. Service tests made on the "Alley L" in the past show that the mileage of plain cast-iron shoes is between 4,000 and 5,000 and that chilled cast-iron shoes give about 18,000 miles in this service. Ten full trains are now in use equipped with Allen-Morrison composition brake shoes, and we are advised that these trains are giving the most satisfactory braking service which this road has ever had.

#### Railroad Legislation in Minnesota.

Following is given an abstract of laws and amendments relating to railroad matters which passed at this year's session of the Minnesota Legislature:

Chapter 34 requires railroad companies to file with the State Auditor each year a statement of the lands in which they have any interest, obtained from the state or the United States. These lands shall be taxed in the assessment of the county in which they are located. The State Auditor is empowered to examine the railroad company's books and to compel the filing of data by writ of mandamus.

Chapter 67 amends the act creating the Railroad and Warehouse Commission adopted March 7, 1897. As



End of Mexican Central 34-ft. Stock Car.

amended, the commission is empowered to proceed upon its own motion to investigate the reasonableness of rates, can require the attendance of witnesses, compel production of books and papers and invoke the aid of the courts. Before it shall declare any tariff unreasonable or extreme, it shall afford the carrier an opportunity for defense.

Chapter 94 amends an existing law so that it is in substance as follows:

Railroads shall provide passenger depots with suitable waiting-rooms and a freight depot. In villages of 1,000 inhabitants or more there shall be a separate waiting-room for ladies. In smaller places there shall be at least one waiting-room. Trains shall stop regularly at such stations. Waiting-rooms shall be open one-half hour before and a like time after the arrival and departure of trains.

When the traffic, outgoing and incoming, amounts to \$15,000 or more, per year at any one station, such station shall be kept open during the business hours of each day. A penalty is prescribed.

In chapter 150 sleeping-car companies are defined as owners of cars on which an extra fare is charged. They shall report to the State Auditor the gross receipts within the state for the year. These shall be taxed three per cent., which tax shall be in lieu of all other taxes.

Chapter 160 requires every freight line or equipment company to report to the State Auditor annually the name, headquarters and personnel of the chief officers, actual value of stock, real estate situated in Minnesota, assessment thereon, total real estate outside of Minnesota, and the whole length of lines of railroads over which the company runs cars. In the case of an equipment company, the whole number and value of the cars owned or leased must be reported, cars to be classified. The State Board of Equalization shall assess the property owned or used in Minnesota.

In determining the value of the same they shall be guided by the proportion of the capital stock of the company representing rolling stock which the miles of railroad over which such company runs its cars in Minnesota bears to the entire number of miles in Minnesota and elsewhere over which the company runs its cars. Persons and corporations interested have a right to be heard before valuation is determined and in the review after it is determined. The tax shall be two per cent. on the valuation, minus the value of any real estate in Minnesota assessed or taxed locally. Moneys so collected shall be turned into the general revenue fund of the state.

The Railroad and Warehouse Commission act of 1887 is amended so as to define more particularly the things that are required to be furnished in annual reports.

Chapter 288 provides that the order of the District Court, in an appeal on the part of a transportation company from a decision of the Railroad and Warehouse Commission, shall go into effect at once, and in case of an appeal therefrom to the Supreme Court the District

Court order shall remain in force pending final decision, unless a stay is granted by the District Court, and in the latter case the appellant shall give a bond conditioned for the payment of passengers and consignors or consignees for any excesses they may have been called upon to pay pending settlement. Petrons shall have a valid claim for all sums paid that shall be in excess of the rates finally established.

An act of 1894 relative to liability of railroad companies is amended by Chapter 346. It makes a railroad liable for damage arising from failure or neglect to fence its road, or to erect crossing and cattle guards. In case of failure of the railroad company to construct a suitable fence, the landowner may serve notice between April 1 and Oct. 1 in each year, and if the railroad company fail within 40 days of the serving of such notice to construct the fence, the landowner may recover in a

at a distance of 2,500 ft., such a signal will subtend with its average width the same visual angle as the width of Snellen's xx-ft. test letters at 20 ft., that is, one minute; but as the length of the signal is more than five times its width, the length will subtend a little more than the standard angle of five minutes, which corresponds to the height of Snellen's test letters, and is the visual angle under which they should be read by a normal eye. A semaphore signal of this shape has been found the best for conditions of service, and if it is seen against the clear background of the sky, its position, horizontal for danger, or at an angle with the horizon for safety, can be easily seen under favorable conditions of atmosphere and background at a distance of over a mile. Such conditions are not always found: the air may be hazy or smoky, or the background may be a building, a bridge, or a green or brown hillside, which will seriously interfere with the visibility of the signal. Again, in rain, snow, or fog, such a signal cannot be seen until the train is very near to it, so in addition to the red home signal near the point to be protected, another green or distant signal is placed at about 1,500 ft. from

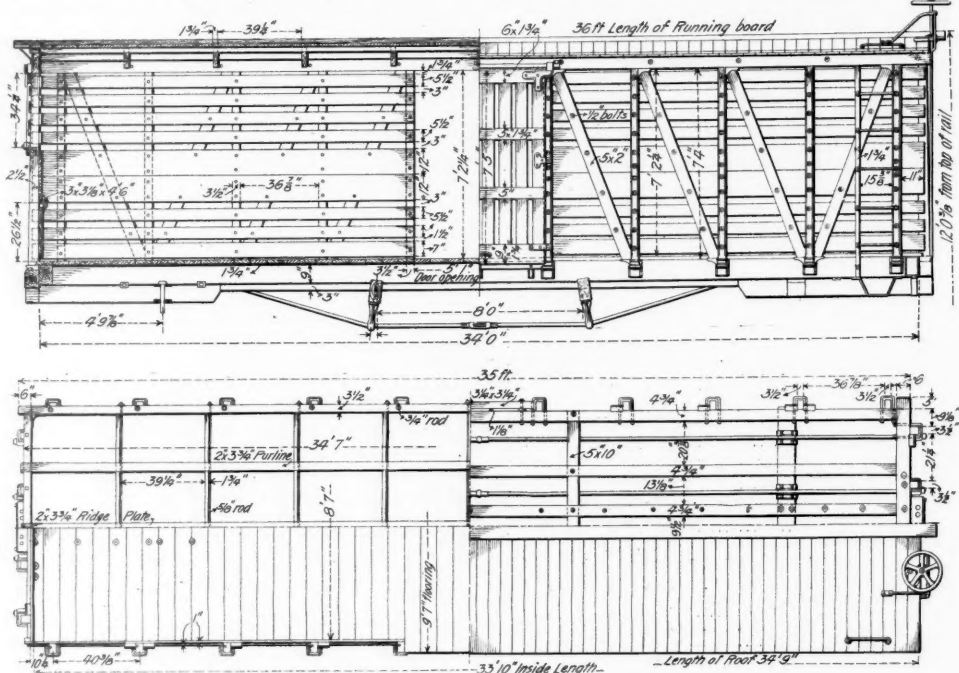


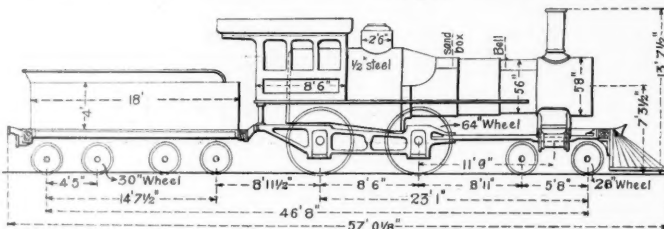
Fig. 5.—Thirty-four-foot Stock Car of 60,000-lbs. Capacity—Mexican Central Railway.

civil action an amount not exceeding twice the cost of making a fence, cost of the action and a reasonable attorney's fee. The railroad shall keep fences in repair, no matter by whom constructed, and shall be liable for all damages growing out of a defective fence.

#### New Suburban Locomotives for the New York Central.

We recorded last week the placing of an order for 10 locomotives by the New York Central & Hudson River Railroad with the Schenectady Works. These engines are hard-coal burners for suburban service. The principal dimensions and the weights are given in the table below and in the diagram herewith:

Driving wheels, diameter.....	64 in.
Cylinders.....	18½ in. x 22 in.
Steam port.....	16½ in. x 1¼ in.
Exhaust port.....	16½ in. x 2½ in.
Bridges.....	1¼ in.
Valves, travel.....	5½ in.
outside lap.....	7½ in.
inside.....	3 in.
Exhaust nozzle, double, diameter.....	3½ in.
Boiler diameter, smallest ring.....	56 in.
pressure.....	160 lbs.
Firebox, length inside.....	114½ in.
width.....	46½ in.



New York Central Suburban Engine.

Flues, number.....	254
outside diameter.....	2 in.
length.....	11 ft. 7 in.
Total heating surface.....	1,713.4 sq. ft.
Grate area.....	32.6 sq. ft.
Weight, engine, working order.....	110,000 lbs.
on truck.....	77,000 lbs.
tender, loaded.....	78,000 lbs.
Driving journals.....	8½ in. x 10½ in.
Coal capacity, tender.....	6 tons
Water.....	3,500 gals.

#### Standards of Form and Color-Vision Required in Railroad Service.

With a heavy train running at 60 miles an hour, a distance of about 1,500 ft. is needed, on level track, in which to recognize a signal, apply the brakes and bring the train to a stop. Important points are guarded by semaphore signals, which have a movable arm about 4½ ft. in length, and from 7 to 10 in. wide. When seen

the first, and is operated to correspond with it. In bad weather, the position by day, or the color by night, must be seen by the engineer as he passes this distant signal, and there is no time for hesitation in recognizing it if danger is shown, for, if the train be moving at the rate of 60 miles an hour he will need the whole distance between the distant and home signal in which to stop his train, and there will be only 15 seconds before the train, if unchecked, will have reached the danger point, or if the speed be 30 miles an hour the time will only be extended to 30 seconds. It is, therefore essential not only that our railroads should be equipped with the best of signals and safety appliances, but also that the men employed in the operation of trains should have such acuteness of vision and color perception that they can recognize these signals quickly and accurately, even under unfavorable conditions, and in this paper your attention is called to the methods of examination and the standards which should be employed to make sure that railroad employees have a safe amount of form and color-sense.

By normal vision is meant such acuteness of perception of form by the eye that it can recognize letters or symbols which subtend a visual angle of five minutes, and whose breadth is throughout equal to one-fifth of their height. This standard was established years ago by Prof. H. Snellen, of Holland, who found by a large number of experiments that the average normal eye could easily read such letters. Many eyes, especially those of young people, have a greater acuteness of sight than this, but, on the whole, it fairly represents the average vision of a healthy emmetropic eye, and has been accepted both in Europe and in this country as the standard in general use.

The letters on Snellen's test types, to be read at a distance of 20 ft., should be ½ in. in height, and if the person under examination reads them with each eye separately at that distance without glasses, the other eye being covered by a card held firmly against the nose, we call his vision normal, or 20/20.

to approach to 10 ft. from the letters in order to read them we call the vision one-half of normal, or 20/40. In practice letters of different sizes are printed on the test-cards and over each line is printed the distance at which it can be seen and read at the standard angle of five minutes, that is by a person having normal acuteness of vision. If we find that at 20 ft. the smallest letters which can be easily read are on the 40-ft. line the vision will be 20/40, or one half. The acuteness of sight is measured by Snellen's formula  $V = \frac{d}{D}$  in which  $V$  stands for the vision;  $d$ , the distance at which the test-types are recognized;  $D$ , the distance at which they can be seen by the normal eye under the standard angle of five minutes.

In ordinary disease, or in errors of refraction, we use these test types to measure the progress of the case, or the best results from glasses; but in certain forms of employment, as in the railroad service, in which keen vision is required, they are used to decide whether a person is qualified for the work he will have to do, and in these cases the question at once arises as to what acuteness of vision should be required for such work.

Defects in acuteness of sight are much more common

\*A paper by Dr. Charles H. Williams, of Boston, read at the meeting of the American Ophthalmological Society, in Washington, D. C., May 6, 1897.



than those of color-perception. On the Burlington road in six years 344 men were rejected for defects of sight and 176 for color, and a careful examination will show not only that defects of sight greatly outnumber those of color, but also that many cases of poor vision are acquired after entering the service, thus making it necessary to have periodical re-examinations of form-vision, whereas, if the original tests of color sense have been carefully made it will be found that very few cases of poor color perception are afterward developed, unless there is an accompanying failure of form vision, which will be discovered by a periodical re-examination of the sight.

Two standards should be required for entrance to the service, a higher for those whose work will be on the head end of a train and in other important positions, and a lower for other operating men. Again, a higher standard should be required in each of those classes for entrance to this service than will suffice for a continuance of duty after years of service. There is no injustice in requiring a high physical standard of men seeking certain kinds of work, and there is no difficulty in obtaining such men; the trouble comes when men are discharged, after years of faithful service, for defects which could have been discovered at the start, if a careful examination had been made at that time.

There is a great variation in the standards of vision required on various roads and in various countries. In Holland, where oculists of the highest standing have had charge of this matter, the rules require for Class A (engine-men and firemen), with both eyes open, normal vision; with each eye separately, the other being covered, normal vision in one eye, and not less than one-half in the other, without glasses; also normal refraction. For Class B (station-masters, conductors, brakemen, switchmen, etc.), with both eyes open, normal vision, without glasses, free from hypermetropia of more than one diopter; with each eye separately, in one normal vision, in the other not less than one-quarter, without glasses. The vision is measured by Snellen's test types. In England a committee of the British Medical Association, after a careful investigation, recommended in their report in 1892 for Class A (engine-drivers, cleaners, firemen, signalmen and pointsmen), in one eye normal vision and refraction, in the other eye not less than one-half of normal vision, without glasses. For Class B (all other situations in the executive service concerned with the moving and signaling of trains), with both eyes open, visual acuteness of not less than two-thirds of normal, without glasses, provided that neither eye has less than one-third of normal vision without glasses, using Snellen's test types. In Belgium, for Class A, in one eye 20-20, in the other not less than 20-30; for Class B, in one eye 20-20, in the other not less than 20-40. In Bavaria, for Class A, 20-40 without glasses is allowed (this class here includes all outdoor employees), and for re-examination not less than 20-40 with glasses.

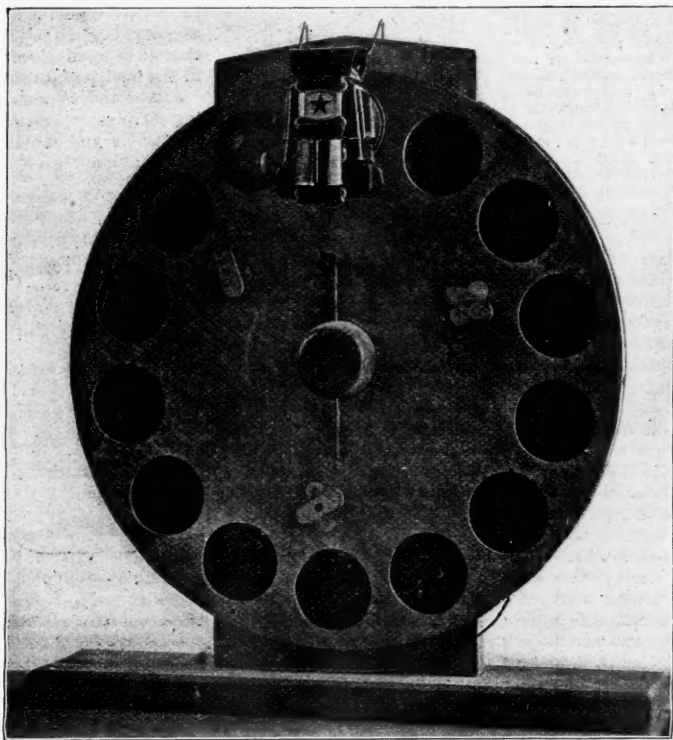
On the New York Central & Hudson River, for a first-class certificate, vision of at least 20-30 is required, but if one eye has 20-20 and the other 20-40, it will answer. For a second class certificate, for yard service only, not less than 20-40 is required, but if one eye has 20-20 and the other 20-200, it is accepted for a second-class certificate. On the Pennsylvania 20-20 in one eye and not less than 20-50 in the other is considered satisfactory, with or without glasses. On the Burlington, for entrance to the engine service, 20-20 in each eye is required, and for the train and yard service, 20-20 in one eye and not less than 20-40 in the other, without glasses in all cases, each eye being tested separately.

It will be seen from the above that the standards of required vision for the first class vary in different places from 20-20, or normal vision in each eye, down to 20-40 in each eye. In some cases provision is made for re-examination, but in many places no separate standard is required for this. The test in general use is Snellen's test letters, although in England some roads use the army test cards, with dots instead of letters. The principal objection I have found to the ordinary Snellen's letters for this work is that they are all printed on one card, and it is not difficult for men who are to be tested to provide themselves with copies of the card in order to memorize the letters. In one case a man read easily the xx line at 20 ft., who was found to have less than 20-40 vision, as he could not read either the xxx or the xl lines at 20 ft. when called on to do so unexpectedly by the examiner.

In order to overcome this difficulty, and also to provide a more convenient form of test card, I had letters of Snellen's standard sizes printed on a series of separate cards, one line on each card, and for each distance had three cards with a different arrangement of letters on each. In testing a person, one of the xx-ft. cards is placed in a good light, 20 ft. from him, and he is asked to read it, one eye being covered. If he does so correctly another of the xx-ft. cards is shown for a second trial, the other eye being covered. He cannot tell which of the cards he will be asked to read, so that even if he had memorized them all he would have to see the letters in order to read the cards correctly, and as there are no letters of a larger size on the same card he could not recite from memory the smaller letters by means of the larger ones that he could see. If he cannot read the xx-ft. line at 20 ft., then the xxx, xl, l, or the lxx-ft. letters are shown in succession, until letters are found that he can read, or if he cannot read the lxx. line at 20 ft. he is brought nearer until a point is found where it can be read, or if he cannot see it at any distance the fact is so noted. This test has been in use on the Burlington since 1893 and has given good satisfaction. I have recently been experimenting with another test card, with figures made to represent a line of semaphore signals, such as are often placed on a bridge crossing the tracks, or at the entrance to a union station. On this card the length and breadth of the arms correspond to the height

and breadth of the Snellen's letters for xx ft., and also nearly correspond, when looked at from a distance of 20 ft., to the size of a standard semaphore arm when seen at a distance of a half a mile. I find, when the relative visibility of this signal card is compared with the corresponding Snellen's letters that the card of signals of the same size as the xx ft. letters can be clearly seen nearly as far as the xxx ft. letters, for with the signals the only point is to recognize quickly and accurately the position of the semaphore arm, as to whether it stands horizontally at danger or at an angle with the horizon at safety; but with the letters small differences of shape must be recognized; it is very easy to confound the C, G, D, O, and some others, and such mistakes should not be repeated.

A railroad company should require 20-20, or normal vision in each eye without glasses; and less than two diopters of hypermetropia of all persons seeking employment in its engine service, who will be required at any time to act as engine-man or fireman. After years of service the requirements may be reduced for Class A to not less than 20-30 of normal vision in one eye and 20-40 in the other with the test letters, each eye being tested separately without glasses, but less than this should not be allowed on the head end of a train. The same standard should be required for men in signal towers, in charge of interlocking signals and switches, and draw bridges; but for the general train and yard service, Class B, lower standards may be allowed. For entrance to this class, 20-20, or normal vision in one eye, and not less than 20-40 in the other, without glasses, should be required. After years of service, on re-examination, this might be reduced to not less than 20-30 in one eye and 20-70 in the other, without glasses. In addition to reading the test letters by candidates for employment, a simple test for refraction, which can be made by any medical examiner, should also be used in all cases. We may leave out of



Williams' Apparatus for Testing Color-Vision.

the question the conditions of myopia and astigmatism, for, if present in any amount, they would cause enough defect in sight to bring the vision below the required standard, but a young man of 21 years of age or thereabouts may be able to read easily the xx line at 20 ft. with each eye, and yet have hypermetropia of two diopters or more, which by the time he is 45 years old, or sooner, will reduce his visual acuteness for distant objects below the standard required, and it is not just to such a man to accept him for the service, and then retire him when he is too old to learn another business, because he does not then come up to the visual standard required, without glasses, although he may have had normal vision in each eye when he first applied for work. Such hypermetropia can be easily detected by asking the applicant to read the xx line of test letters on another card at 20 ft. while looking through a convex lens of two diopters: if with each eye he can read the letters correctly through this glass he should be rejected, for it shows he has a hypermetropia of two diopters or more. A test for refraction with the ophthalmoscope would be better than the above, but we must bear in mind that these tests must often be applied by medical men who have had no special training in ophthalmology, and with a large railroad like the Burlington, having more than 7,000 miles of line, it is impossible to have men brought in to central points over great distances for examination when they apply for work.

I recently had a case to examine where the vision of an engineer had been reduced to  $\frac{1}{2}$  of normal in each eye. There was no other trouble except a hypermetropia of three diopters, and with proper glasses the vision was brought up to normal in one eye and  $\frac{1}{2}$  in the other. He was transferred to other work in which he could use his glasses, but in this case the simple test with a convex glass would probably have shown the trouble at the first examination for entrance to the service.

A periodical re-examination of the form vision should be required of all men employed in the operation of trains or signals every three years, for the sight is often impaired by disease that may show no outward change, and such re-examination should also be made before promotion, after serious illness or injury, after accidents which might have been due to defective sight, or when from excessive use of tobacco or other cause it is deemed necessary.

The certificate of examination given to the man should state the date of examination, the occupation which the certificate covers, and whether or not any defect is found in the acuteness of vision, color-perception or hearing, and the certificate should be signed both by the examiner and the person examined.

In all examinations of sight care should be taken to see that uniform and accurate test letters are used. Within a month my attention has been called to sets of test letters, recently published, in which there was a considerable variation in the size of the letters to be read, at 20 ft., on different cards published by the same firm. The illumination of the letters should also be clear and as constant as possible, the card being hung where it gets the daylight full upon it, but not in the sunshine or where the person reading it will have to look directly toward a strong light.

The examination blank used on the New York Central does not provide for any test for the range or field of vision, and in my experience I have never known a person to be rejected for a defect in either of these things when the acuteness of vision came up to the required standard. It is, however, well to have a reading test in order to make sure that the person examined can read both print and written train orders at the ordinary distance. I have known an engineer who was found by this test to be unable to read, although he had normal vision, knew his letters and could sign his name; he was in the habit of getting his fireman to read all train orders to him, but when this condition was discovered he was laid off until he could learn to read, and write more than his signature.

In regard to the use of glasses, the instructions of the Pennsylvania Railroad say: "If one eye has 20-20 and the other eye not less than 20-50, with or without glasses, the sight may be considered satisfactory," but no statement is made as to whether this will be satisfactory for an examination for entrance to the service, or only for re-examination, or whether glasses will be allowed on duty. It will be found in practice that glasses for distant vision cannot be worn on duty by engine-men and others whose work requires them to be out of doors in all kinds of weather, for steam, rain, smoke and snow interfere seriously with their use. For this reason the acuteness of distant vision for these men should always be tested without glasses. With cases of simple presbyopia it is different. Here the distant vision remains unimpaired, and when glasses are needed for occasional use, as in reading train orders, they are not incompatible with good service; the presbyopia will have to be considerable before it will interfere with the telling of time by a watch or the reading of steam or water gages without glasses.

The standard examination for color-vision should include three things: 1. A test with colored signal-flags. 2. A test by comparison of colors by the Holmgren worsteds. 3. A test with colored lights seen through openings of regular size, which will form small images on the central part of the retina. The acuteness of color-vision varies considerably from the normal standard, as does form-vision. We may have a feeble color perception, an incomplete loss of color sense, generally for red and green, or a complete loss of perception for one or both these colors, and in rare cases a complete loss of all color perception, in which the solar spectrum looks like a gray smear of varying shade, but no color.

The object of our tests is to discover the extent and character of the defects, and whether they are sufficient in amount to disqualify according to the standards adopted. The test with flags shows whether the man can give correct names to the flags and can tell their use and meaning. It is also desirable to use one of the flags at a time as a test object, and get the applicant to pick out from the heap of Holmgren's worsteds all the colors that look like the flag. It will often be found that correct names can be given to the different flags, even when the tests by worsteds and colored lights show a considerable defect of color sense; but when used as a comparison test a green may be selected among other colors as looking like a red flag, or vice versa. The second test, by comparison of colors without naming them, selecting from a large number those which appear to the applicant like certain test-skens, light green or pink, according to the method proposed by Professor Holmgren, is the most satisfactory and easily applied of all the good qualitative tests, but it does not give a sufficient test for small central scotomata.

I have recently had a conductor, who passed both the Holmgren and the Thomson tests without making a single mistake, and who selected his colors without hesitation, but when examined by colored lights transmitted through small openings, or even with switch-light lenses, before a lamp at 20 ft. distance, he called a red light "white" in four different cases; he had a central defect in the retina, probably caused by the use of tobacco in excess, yet the area affected was so small that the retinal image of the flag or the skein of worsted was formed partly on the diseased retina and partly on the healthy portion outside the scotoma where the color could be easily recognized, but when the retinal image was reduced in size, as with the lights, it was formed entirely within the borders of the scotoma, and red lights were called white or sometimes green. It will not do, however, to substitute the tests with such lights for the Holmgren test, as the lights give little chance for comparison or for the selection of confusion colors, and for ordinary cases of congenital color defect it would take a long and tedious examination to reach the same result that could be arrived at more quickly by the worsted test. On the other hand the test with lights, with regulated openings, should be used in addition to the worsted test, as was first proposed in Holland. The regulations of the Dutch railroads specify that a quantitative test for color-sense be made in every case by Donders' method. In his instrument the light from a standard candle is allowed to fall on a disk carrying red, green, blue and ground glasses, and in front of this disc is a diaphragm with openings of 1, 2, 5, 10 and 20 mm. diameter. The color can be changed by rotating the disk, and the man is requested to name the color as seen through the smallest opening when placed 5 m. from him; if he cannot do this he approaches the instrument until the colors can be recognized or a larger opening can be used. Professor Donders accepted the formula for acuteness of color-

perception as  $\frac{a}{A}$  in which  $a$  is the visual angle at which the person examined sees the colors, and  $A$  the angle at which the examiner sees them. If the examiner can see the red and green lights through the 1 mm. opening at a distance of 5 m., and the person examined only sees them at 1 m., his color perception would be one-fifth. In these cases we have to depend on the acuteness of color-sense in the eye of the examiner as the standard with which the applicant is compared, and this standard may vary considerably in different persons. Again, the distance of the candle from the colored glass is an important factor, and the red can be seen by normal eyes with the candle at a greater distance from the glass than the green. In all signal lanterns, however, the light must remain at the same distance from the lens, so we may disregard this difference. Instead of taking so small an opening as 1 mm. at 5 m. distance for the standard test for transmitted light as used in Holland, it will be found better to use a 2 mm. hole, or about 5.64 of an inch, and to place the person to be examined at a distance of 20 ft. from it. Under



these conditions the opening will subtend a visual angle of one minute at the eye, and will correspond to the width of the letters on the xx-ft. Snellen test card used for that distance. If we make the other openings in our diaphragm  $\frac{1}{16}$ ,  $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  in. in diameter respectively, we shall have a series of diameters that will nearly correspond to the width of the series of letters on Snellen's test card, and which at corresponding distances will subtend nearly the uniform angle of one minute. If we consider as a sufficient standard for this test the ability to recognize red and green, either alone or combined with London smoke glass, to vary the intensity of the light, and also white light, either alone or combined with the London smoke glass, all seen under the standard angle of one minute, we can then use the other openings in this diaphragm to give a fraction which will represent the amount of color-perception as compared with this unit, just as in the case of form vision. We cannot get with color-perception by our ordinary tests the same fine gradations of acuteness that we get with form vision. We also find many eyes whose color-perception is more acute than this standard, just as we find eyes that can see the xx line of letters at a greater distance than 20 ft., but it furnishes us with an easy test, having direct relation to the standard of form vision, and one which is useful in detecting defects in the central portion of the retina.

About five years ago I made an instrument on this principle which has given satisfactory results, and with it the standard switchlight lenses and semaphore glasses can also be used as confirmatory tests. The accompanying cut gives a back view, showing the position of the lantern and the disks of colored glass. The colored glasses are held in place in cells made between two wooden disks, which are clamped together and can be revolved at the back of the instruments, so as to bring any glass in front of the lantern, and a spring at the lower part catches lightly in grooves on the periphery of the disks, so as to center each glass before the light. If it is desired to change the order of the glasses, or to insert new ones, the disks can be easily unclamped, and any desired change made. A small revolving diaphragm, with graduated holes, and two London smoke glasses, are fixed to the front of the large disks, being so arranged that by their use the size of the hole and the intensity of the light may be varied at will.

In a paper by Dr. Nuel, of Liege, published in 1895, he states that in Belgium in the confirmatory test they consider the color-sense as sufficient if the applicant distinguishes red and green through an opening of 2 mm. at five meters distance when lighted by an ordinary kerosene lamp. In Holland they require for color-sense in enginemen and firemen a power of distinguishing colors with both eyes open of not less than four-fifths, or in each eye separately not less than one-half, using the 1 mm. opening as the standard, and for other specified employments a color-perception of at least three-fifths with both eyes open, or not less than one-quarter in each eye alone. For re-examination in the first class, the standard is dropped to at least three-quarters with both eyes open, or at least one-third with each separately, and in the second class, with both eyes to at least two-thirds, or with each eye separately, to at least one-quarter, and Donders' instrument is required to be used in all these tests. I used a Donders instrument, made by Kaagenar in Utrecht, for some time, but did not find it so convenient or satisfactory as my instrument with the larger openings and greater number and variety of glasses. Even with Holmgren's worsteds it is possible to make a distinction between some of the greater variations in color-sense, for if a person is hesitating, picks up some confusion colors and compares them with the test skein, perhaps selects them and then discards them, or picks up some of the true colors, and after comparison rejects them, finally selecting none of the confusion colors, it shows that he has a feeble color-perception; if he selects with the greens some of the confusion colors, but with the pink or rose skein makes no mistake, it shows that he has an incomplete defect; but if with the green skein he selects confusion colors in addition to the greens, and with the rose skein selects with the rose colors some blues or violets, it shows he has complete defect for red, or if with the rose skein he selects in addition to rose color some greens or grays it shows he has complete defect for green. On the Burlington I found it best to have each of the 117 colors of the Holmgren worsteds provided with a small brass numbered tag, which can be used to make a record of the numbers selected by the applicant, just as in the Thomson test, and each set of worsteds being carefully prepared in my office, the numbers and colors were uniform for the whole system, so that when the results of each examination were forwarded to me for approval they could be easily checked.

It is very necessary in this work to have a general supervision placed in the hands of some competent person, who can properly instruct the examiners, see that they carry out their directions and make a periodical inspection of the tests they use in order to make sure that they are kept in good condition, otherwise there is danger that the examiner will become careless, or that the test cards or colors will deteriorate so that they can no longer be relied on to give proper results; the record of all examinations should also be filed in one central office.

So long as red and green signals are used for night work (and no other colors seem better adapted to this use) no applicant should be accepted for service in a position which will require him to use such signals who has incomplete or even feeble color-vision, and if the entrance examinations have been thoroughly carried out, according to Holmgren's directions, and also with transmitted lights, there will be no need of a repetition of these color tests, except as before stated where the form-vision has become impaired, or where for some special reason it seems best to repeat the examination. The tests for both form and color vision should be made when the man is not fatigued by a long tour of duty or exposure, for it has been found that the acuteness of both form and color-perception is often diminished after two hours or more of engine work. After long runs and unusual exposure this temporary reduction in acuteness may be considerable, and it furnishes an additional argument for insisting on a high standard for such service. If one-half of normal vision were to be accepted as a minimum for each eye when the person was rested and in good health, the conditions of service might easily reduce this far below the danger point, but if a high standard is required the vision may be temporarily reduced by fatigue without becoming dangerous.

In a report on the sanitary service of the railroads in Holland, presented to the International Conference in Amsterdam in 1895, it is stated: "Experience has shown that since the examination for admission has been carefully made, the re-examinations have shown scarcely any incapable men. It is also to be noted that the employees themselves in general recognize the utility and importance of these examinations." In a letter from one of the officers of the Burlington, written to me Nov. 18, 1896, he says that the operating officers of that system thoroughly approve of the examinations for entrance to their service, which include not only the tests for sight

color-sense and hearing, but also a general medical examination made by the medical examiners of the road, who are all well qualified physicians, and he also states that the general character and efficiency of the employees has been improved by these examinations, which are fairly and thoroughly carried out. It seems to me that more can be accomplished in the way of improving the standards and methods used for testing sight, etc., by showing the operating officers of the railroads that it is for their own interest and for the interest of their employees to have such tests carefully made, and to use such methods as shall be just and efficient rather than by trying to force measures on the railroads through legislation, which is apt to be crude, and is met with opposition on the part of both the railroad companies and their employees, as being directed against their personal interests, whereas proper methods rightly applied should meet with the approval of both officers and men.

In addition to the tests for men, more care should be taken with the signals which the men are to use, especially in the case of colored lights. Captain Abney and others have shown the spectroscopic quality of various red and green signal lights, but it will be found in practice that a test based on the photometric quality of the lights is more important, especially in the case of persons with feeble color-sense, who depend largely on a difference of intensity to recognize the difference between the red and green lights. With reference to this point, they have kindly tested spectroscopically for me at the Massachusetts Institute of Technology three switch-light lenses, with the following results:

No. of Lens.	Maximum wave length transmitted.	Minimum wave length transmitted.
No. 1.	7,130	5,820
" 2.	7,150	5,910
" 3.	7,150	6,200

All these lenses were flashed on their smooth surface with a red copper glass, and these figures show that they all transmitted light from about the same part of the spectrum. No. 1 was so light a red that it might easily be mistaken for white when seen at a distance. No. 3 was so dark a red that it could be mistaken for green by a person defective in color sense, as has actually been done with this lens. No. 2 was a standard lens of medium intensity. Nos. 1 and 3 would have been rejected by a photometric test, although the spectroscopic did not show much difference between them, therefore some test based on the intensity of the transmitted light should be applied in accepting all red signal lenses.

#### Discussion.

When the foregoing paper was read before the Boston Society for Medical Improvement, last February, it was followed by a brief discussion, the principal speaker being Dr. B. Joy Jeffries, who called attention to the fact that it is just 20 years since he first brought before the public in this country the question of defective form and color sense.

Dr. Jeffries says that in using Donders' apparatus he uses different degrees of London smoked glass, so that where a color-blind person distinguishes lights by the amount of light, he can be detected. Dr. Jeffries does not ask the examinee whether a certain light is green or red, but whether it is safety or danger. He has made 35,000 examinations with the Holmgren test (matching different shades to a standard color); and regards this as better than any other one test.

The doctor went on to say that it was impossible to get the railroads to use good methods. If a single road is strict and scientific and rejects men, they can go to some other road and get a job. When you do anything which interferes with the "patronage" of railroad officers or with the men who are in brotherhoods, you encounter difficulty. Massachusetts has a law, but the tests are made without regard to its most important requirements. Holland, thanks to Professor Donders, is the only country where the testing of eyes is properly done. Connecticut started to make a good law but politics choked it off. Ohio and Illinois have tried and failed in the same way; Alabama had a good law but the politicians secured its repeal.

Dr. Jeffries says that masters and mates of vessels are not examined, pilots being the only class tested. Every possible effort has been made to prevent suitable examinations of masters and mates. Dr. Jeffries protested that the examinations on the Old Colony could not be accepted as safe, and said that Dr. Thomson's test is not a true Holmgren test.

#### Brown Coal Handling Machinery on the Lakes.

Within the last few years several different kinds of machines have been built at the Lake Erie ports for loading coal directly from the cars into the boats. In some of these plants the important item of breakage of the coal has apparently been neglected. The Brown Hoisting & Conveying Machine Co., of Cleveland, O., has, however, given the question of breakage particular study, and has recently built five machines which handle the coal in such a way as to reduce the breakage to a minimum. One of these machines is now in operation at Ashtabula Harbor, O., one at Cleveland, one at Huron and two at Toledo. They are all alike except in some minor details.

The railroads, if not operating the machines themselves, arrange to deliver the loaded cars to the plant. The cars are run upon the elevated tracks at A, Fig. 1. From here they run by gravity, one at a time, to B. From this point a disappearing carriage, which consists of a small counterweighted car, with a bumper at one end and drawn by a cable, pushes the car into the tippie D. Here the car is securely held in a frame by a hydraulic clamping device which takes hold of the top of both sides of the car. The clamps are designed for adjustment to the various widths and heights of different cars. When the car is securely clamped it is turned over sidewise allowing the coal to gradually slide into six pockets. These turn over into six buckets, and when at the bottom of the bucket the pockets automatically

unlock, allowing the sides to fall back against the sides of the buckets, so that when the tippie is turned back lowering the empty car, the pockets are drawn out, leaving the coal in the buckets. As the tippie is lowered the pocket doors automatically close and lock and the tippie is ready for the next car, which, as it is pushed into the tippie by the disappearing carriage, pushes the empty car out at the other end. The empty car descends by gravity and is automatically switched to a side track.

A man is on every loaded car as it is run into the tippie. This man sees that the car is properly placed and that the hydraulic clamps are adjusted, and also attends to the fastening and unfastening of a pair of end-doors, or guards, which are made of iron and wood and attached by quick acting screw clamps to the top of each end of the car before turning it over. These guards are to prevent any coal from spilling over the car ends. They are suspended by a chain and counterweight from the stationary framework of the tippie and are always within convenient reach. After the car is emptied and turned back in position to be run out of the tippie, the man unclamps the guards and waits for the next loaded car.

There are 18 buckets, each of six tons capacity, placed on three special bucket cars which travel on a track extending along the dock directly in front of the tippie. These cars are fastened at a convenient distance apart to a pulling line by which they are placed in front of the tippie to receive the coal from the pockets. An indicator shows the operator whether the car is in position for the pockets to enter the buckets without interference. The buckets on one or two of the cars are kept filled so that no delay may occur in putting the coal contained in the buckets into the boat.

All the above operations, viz., running the disappearing carriage, operating the hydraulic clamps, turning the tippie and moving the bucket cars, are done by means of hand levers and foot brakes by one man in the

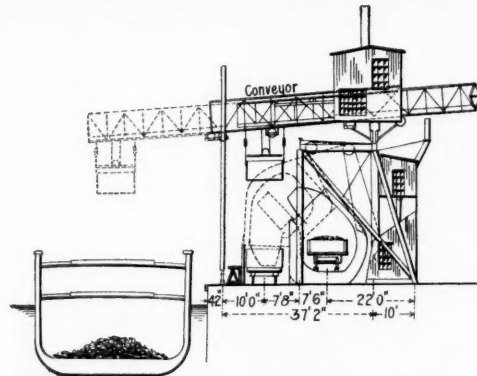


Fig. 3.—Section A A, Brown Coal Handling Plant.

tippie operator's house H. His position is such that he can always see the work he is doing. Directly under the operator's house is the tippie engine-room containing the engines, boiler, pumps, etc., all of which are looked after by a single engineer.

The work of putting the coal from the buckets into the boat is accomplished by two conveyors, or traveling cranes M and N. These are made to travel independently up and down the dock at the will of the operator at a maximum speed of 500 to 600 ft. a minute. Each crane is fitted with its own engines, boiler and operating mechanism complete. The back ends of the cranes travel on an elevated track allowing them to pass over the tippie structure, while the front end, consisting of a powerfully built shear leg upon which rests the superstructure, travels on a single track laid on the front of the dock. Each crane is fitted with a long arm, or ram, which can be run out to any desired distance over the boat. From the ram is suspended a patent bottom-block, fitted with two hooks at each end for hooking on the buckets. This work is done by two men who stand on platforms extending along each side of the bucket car track. By lifting one set of hooks the bucket is raised and carried to any desired point. Then by lifting the second set of hooks the bottom of the bucket is opened and the shell is pulled away from the coal. The design is such that the bucket can be lowered to within a few inches of the floor or coal pile before opening the bottom, hence there is practically no fall of the coal, and consequently the breakage is a minimum.

As soon as the bucket is empty the operator lifts the first set of hooks, which closes the bottom. The bucket is then put back on the car in the place from which it was taken, and then unhooked. Each crane has one operator and one engineer, but only two men are required for hooking on and unhooking the buckets for both cranes, which work over one bucket car at a time.

But 10 men, including a foreman, are required to operate one of these plants, except where it is impracticable to run the empty cars out of the tippie by gravity. In such a case a special locomotive car is used, requiring the services of one additional man. The cost of operating a complete plant, including the wages of the men, necessary fuel, oil, waste, etc., and allowing a fair amount for depreciation of plant, does not exceed \$40 a day. The plant is guaranteed to load from cars holding not less than 24 tons each 3,000 tons in 10 hours. Actual practice, however, has shown that with the ordinary run of gondola and hopper bottom cars, the capacity will reach 4,000 tons, which amounts to loading a boat with coal, for about one cent per ton. The tippie itself



is capable of easily handling from 8,000 to 9,000 tons in 10 hours, so that if at any time it is found necessary or advisable to increase the capacity of the plant it can be done at a comparatively small expense by adding one or two more traveling cranes and additional buckets and bucket cars.

portions of two per cent. and over materially decreases the shrinkage of cast iron and its presence seems to be a softener of iron. The effect of aluminum in wrought iron is not very marked in the ordinary puddling process, but it seems to add somewhat to the strength.

Pure aluminum can be rolled so as to be quite stiff,

length is .000013, and its relative heat conductivity as compared with silver is 31.33. These are but a very few of the facts brought out in the article, but they may be sufficient to show that the metal has properties to commend it to a large variety of work, and the output from year to year will probably increase very rapidly. Mr

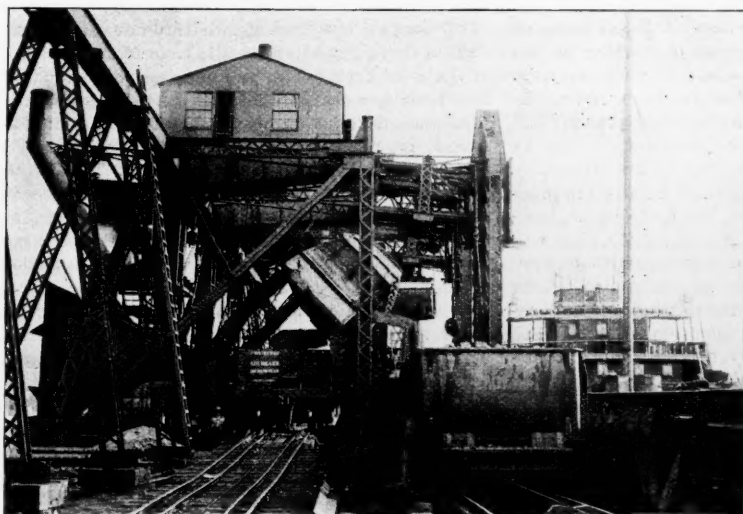


Fig. 4.—Brown Coal Handling Machine on the Lakes.



Fig. 5.—Brown Coal Handling Machine in Operation.

These plants are entirely new in their construction and method of operation, and are the invention and design of Mr. Alex. E. Brown, who has designed and built much of the coal-handling machinery and most of the ore handling machinery now in use on the great lakes.

Fig. 2 shows an elevation of the plant, and Fig. 3 gives a cross-section. Figs. 4 and 5 are from photographs and show one of the plants in operation.

#### Some of the Uses of Aluminum.

The August and September numbers of the *Journal of the Franklin Institute* contain a lecture by Alfred E. Hunt, President of the Pittsburgh Reduction Co., before the Franklin Institute, in which are discussed in some detail the present uses of aluminum in the arts. A few figures and facts as stated by him will be of value in showing the present status of the manufacture of aluminum and its possible development.

Aluminum is now selling in large quantities at 31 and 32 cents a pound in ingots, and the increase in price for sheets, plates and bars over the price for ingots is not greater than that charged for either copper or brass. The output for 1896 was about 1,300,000 lbs., and the smaller output for this year will be about 2,000 tons, about half of which will doubtless be exported. When compared with the production in 1889 of over 100 lbs., and at a selling price of not less than \$8 a pound, the present output is very encouraging.

Probably one of the most important uses of aluminum has been in the manufacture of steel ingots and steel castings. It increases the tensile strength of steel without decreasing its ductility; improves the homogeneity and removes any oxygen or oxide that may be in the steel, and also renders it less liable to oxidation in casting. Besides this, it permits the production of a smoother

and while being annealed, an even heat should be maintained in the muffle and the metal on being withdrawn should be allowed to cool slowly. Pure aluminum is not by any means as readily corroded as the alloys, the natural impurities being silicon and iron; they both tend to cause it to corrode more easily than the pure metal.

Aluminum is having extended use in chemical laboratories, as for condensers. As a reducing agent it has already been put into practical use. The experience of the Pittsburgh Reduction Company with the alloying metals as hardeners is to the effect that copper and nickel, while answering the purpose fairly well, do not render the aluminum as hard as many other alloying metals.

Some other uses of aluminum may be mentioned briefly as follows: Aluminum bronze powders have almost entirely replaced silver bronze powders. Aluminum leaf is largely used for decorative work, where it has been especially valuable, because it does not tarnish. It has been used to harden rubber, for improving brass castings, for purifying drinking water and in construction of yachts.

As a conductor of electricity aluminum stands fourth in the list, having a relative electrical conductivity of 63 per cent. as compared with pure silver. As soon as copper is mixed with aluminum the conductivity decreases very perceptibly. Already the Pittsburgh Reduction Company has furnished several hundred miles of aluminum wire for movable telephone and telegraph work. Copper wire weighs 3.3 times as much as alu-

Hunt estimates that the consumption of aluminum in the United States for the year 1900 will be 10,000 tons.

#### A Distance Indicator for Calling Attention to Meeting Points.

A locomotive on the Great Northern has been fitted with a distance indicator which is designed to warn the engineer when he is approaching a meeting point. The mechanism, connected with the forward truck of the engine, operates a dial in the cab, showing the distance traveled by the engine; by setting the pointer of the dial when starting from a given place and by suitably fixing a stop, the apparatus can be made to ring a bell after the engine shall have traversed any predetermined distance. Numerous trials have been made, the bell being set to ring one mile short of the point at which the train must be stopped.

#### New Ore Steamers for the Great Lakes.

It has been announced that the Carnegie Steel Co. intends to build a fleet of large ore steamers for the Great Lakes, to be put in commission at the opening of navigation next spring. The fleet will comprise five or six big steel boats, and between \$1,500,000 and \$2,000,000 will be expended in building them. This information was made public in confirming the reported purchase of the Gogebic range. The number or the character of the vessels have not been determined, but they will probably be counterparts of the Bessemer fleet, now carrying ore for the Carnegie Company from the Mesaba range.

The new boats will probably be built at Cleveland, or at the McDougall shipyards, at West Superior, Wis., where the Rockefeller whalebacks were built. It is expected the contract will be let at once, as the officials of the Carnegie Company are said to be anxious to have them ready for regular duty at the opening of navigation

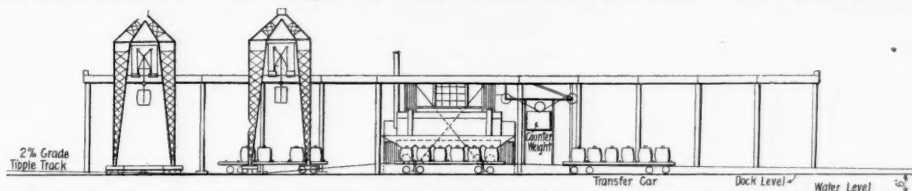


Fig. 2.—Front Elevation of Brown Coal Handling Plant, Looking from Water.

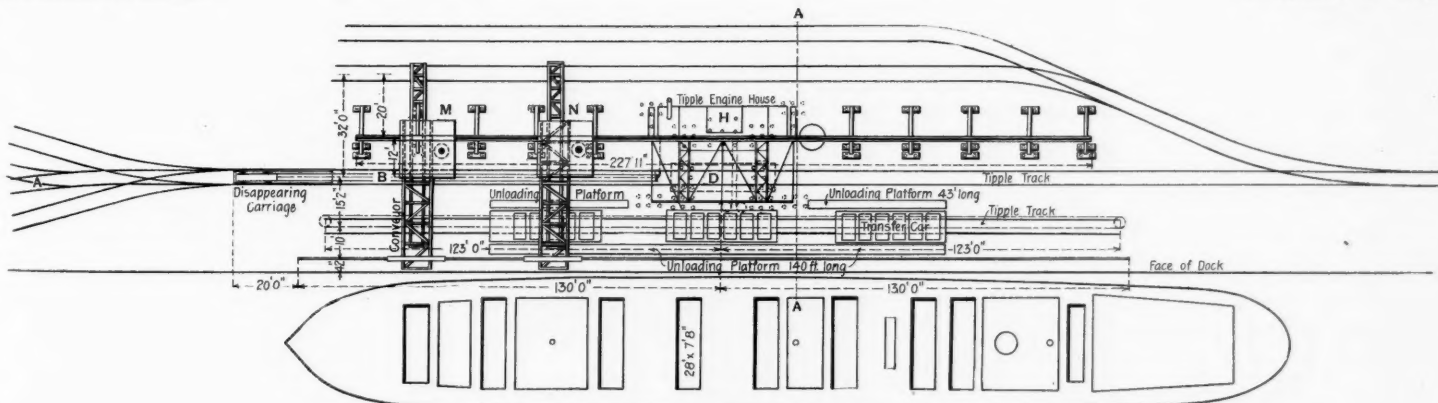


Fig. 1.—Plan of Brown Coal Hoisting and Conveying Plant.

surface of the casting, quiets the ebullition in molten steel, and increases the soundness of the tops of ingots, thus decreasing the small losses which otherwise occur. In open hearth steel ingots about two to four, or at the most, five ounces, of aluminum is used to a ton of steel, it being added in the ladle as in the case of steel castings.

In cast iron from one to two pounds of aluminum to a ton is added to the metal as it is being poured from the cupola or melting furnace, and its presence in pro-

rium wire and the tensile strength of the two is about the same.

The mean specific heat of aluminum from 0 deg. to the melting point is .2185, water being taken as 1. This means that the quantity of heat which would raise the temperature of a given quantity of aluminum through 1 deg. would raise the temperature of the same quantity of water to .2185 deg. The linear expansion is relatively very high, being exceeded only by zinc and lead of the common metal. The expansion per degree per unit of

They will be used exclusively for the present in carrying the ore from the new Carnegie mines on the Gogebic range, and they will ply between Ashland, Wis., and Conneaut Harbor, the northern and lake terminal of the Pittsburgh, Bessemer & Lake Erie Railroad.

#### American Street Cars for Germany.

The St. Louis Car Co. has received a contract to build 100 trolley electric cars for the Berlin Street Railway, of Berlin, Germany. It is reported that the same road will soon place further orders.





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#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Color-blindness is always a timely subject, for new men are constantly being taken into railroad service, and the necessity of carefully guarding against hiring men with defective vision seems still to be but partially appreciated by many employing officers. Therefore, we devote considerable space this week, without apology, to an article on eye-examination by Dr. Williams, of Boston. The doctor tells little that is new, of course, except in minor details, but his essay is worth preservation as a careful and sensible résumé of points to be kept in mind in making examinations, all the results of or tested by his own experience. The omission of speculative or other matter that is not essential is one merit of the article, and by no means a minor one. Like some other questions connected with railroad signaling, that of defective vision is entitled to be settled, and settled on purely scientific grounds, whether "experience" calls it important or unimportant. It is easy to say, by act or by word, that the question need not be settled at all. The probable danger from the presence among 100 enginemen of a few individuals who cannot surely distinguish green from red may be made to look very small, if one is prejudiced in the right direction to lean that way; but why yield to prejudice or sentiment at all when the true and right course is so plain and its following so easy? Where the problem is so simple the toleration of any element of doubt is reprehensible, especially in such a matter as controlling the speed of passenger trains at danger points, where a small error may produce a great disaster. Dr. Jeffries' view of the situation as stated in his comments is, doubtless, substantially correct. Legislation is full of uncertainties; and if by good fortune a reasonable and effective law is secured in any state its enforcement is found to be difficult or impossible and its perpetuity cannot be depended upon. The superintendent who is determined to free himself of all doubt as to the visual qualifications of his enginemen has, also, in many cases the drawback of lack of interest among his own officers; but his duty, nevertheless, is plain, and he should never give up.

In a letter published in our issue of Sept. 24, Mr. R. A. Parke called attention to certain features of the brakeshoe question, especially the effect of the element of heat on the co-efficient of friction. We cannot agree fully with Mr. Parke as to the M. C. B. laboratory tests showing conclusively that the temperature of the brakeshoe has an important bearing on the co-efficient of friction. During the early part of this work it was thought that certain marked variations in results from the same shoe were caused by differences in temperature, which latter were found to be due to small variations in the surfaces in contact. As the testing machine was arranged at that time it was not possible to conduct tests which would furnish definite information in regard to the effect of temperature, first, because of insufficient power to drive the machine with the brakeshoe bearing on the wheel, and second, because the shaft bearings of the

testing machine heated so rapidly that continuous braking tests were not practicable. It was the intention, however, to make certain changes in the machine which would permit continuous tests at constant braking pressures and constant speeds, but for want of time this work was not taken up. From the M. C. B. tests made under conditions corresponding to emergency applications very little can be learned regarding the effect of the element of temperature on the co-efficient of friction as the friction during such a stop is constantly varying, due to other factors, chief of which is the variation in speed. By keeping the braking pressure and speed constant, the effect of temperature can be studied directly, such conditions in the laboratory corresponding most nearly to those obtained in practice on long, heavy grades. We quite agree, however, with Mr. Parke that the material which will give a uniform co-efficient of friction, without running up near the end of the stop is best suited for braking purposes, and that the soft composition materials appear to answer this requirement better than the ordinary plain metals. It should be noted, however, that the results of the laboratory tests given in our issue of Sept. 24 in tabular form are averages of a number of tests which were considered reliable and not single tests selected from a group. It is to be regretted that lack of time prevented more complete tests of the soft composition brakeshoes being made. At the time the laboratory tests were conducted it was quite generally believed that soft composition brakeshoes would fail in service and the possibilities of this class of shoes were not fully appreciated until some time after the shop tests were finished; otherwise more complete data would doubtless have been obtained.

Now more complete laboratory tests of the soft composition brakeshoes should be made, but it is not likely that this work will be undertaken by the committee of the Master Car Builders' Association this year. Beside the cost, which is large, the time required of the individual members of the committee to properly direct and superintend such work is considerable. It is but natural that the committee should delay taking up this investigation until complete development has been made of a number of new brakeshoes. What is most needed, however, is accurate information during the development of new shoes; and not so much that the information should be presented after railroads have gone to the trouble and expense of conducting separate tests, and have determined that certain new forms of shoes are fitted for their service. For this reason, if for no other, it would, perhaps, be well if the M. C. B. brakeshoe testing machine, now at Wilmerding, Pa., could be established at a place, where, at little expense to the Association and without encroaching upon the time of the individual members of the committee, shop tests of brakeshoes could be made whenever information regarding new shoes is needed, and one naturally thinks at once of the mechanical laboratory at Purdue University. If the testing machine were moved to that place it would probably be of greater value to the members of the M. C. B. Association and to the brakeshoe makers. Systematic investigation could then be carried on from year to year and many questions relating to the friction of metals could be settled, besides having the machine always available for making tests of new brakeshoes. The work which has so far been done by the committee in the way of laboratory tests can only be considered as a beginning. The valuable information which has been obtained from the locomotive testing plant at Purdue has resulted from a series of long, careful experiments, and can be pointed to as an example of what can be accomplished by a well-conducted investigation covering a period of about six years.

The merchants of New York, having sold untold millions of merchandise to retailers who have come to the metropolis on special tickets at two-thirds fare, are as unsatisfied as ever, and have asked the Joint Traffic Association for reduced rates on still more dates; but Commissioner Blanchard asks them to wait a while, until he can tell whether the roads have made anything out of the business already done under the special agreement. As any attempt to separate these buyers' freight shipments from other freight will probably be largely unsuccessful, and as the advantage derived from an increased number of passengers is also a very difficult factor to get at, we may rest assured that Mr. Blanchard's enthusiasm on the subject of buyers' excursions is not great. If the increase of earnings arising from this alleged enlargement of the circle of buyers is large enough to warrant continued reduced passenger rates, it is probably apparent to the officers of the roads interested long before this; if it is not apparent,

its existence not only is doubtful but will remain so. An amusing announcement has been made this week; amusing, that is, in its quietness, to one who has observed the brass-band methods of the Merchants' Association, in getting, and in telling about, the excursions which it was organized to promote. The New York Board of Trade and Transportation, an organization of several years' standing, announces excursions to New York at two-third rates on a dozen days in October, and apparently from all the territory of the Joint Traffic Association; and this reduction has been secured without the least trace of the laborious negotiation which the new association found it necessary to go through with. The magic wand in the hands of the B. T. & T. is the word "convention." Merchants are invited to New York, not on the sordid business of merchandising, but to attend meetings "to discuss the most important public questions of the time." If, as a mere side issue, attendants bring along a few bags of eagles and double-eagles and spend them for dry goods, groceries, Christmas supplies, etc., why, no harm will be done! The jealous outsiders who have complained at the favoritism shown New York by the railroads will now be completely silenced. The granting of reduced rates to conventions or gatherings designed to promote the spread of useful knowledge is as old as "the oldest inhabitant"—or John N. Abbott; who can object to it? We confess that the list of subjects for the sessions of the "convention" does not, in our opinion, promise a record-breaking attendance, but what of that? There is no fine for going to the theater instead of the convention, and the essays will all be printed. Indeed, the announcement informs us that not even the authors of the papers will need to attend the conventions; there are plenty of good readers in New York who can be hired to read, and probably hearers also can be hired if it proves difficult otherwise to fill the seats. Among the essays announced are the following:

A United States Department of Commerce—Joseph Nimmo, Jr.  
A United States Department of Health—Warren E. Anderson.  
American Trade Marks—Morris S. Wise.  
Reform of the U. S. Consular Service in the Interest of Commerce—Oscar S. Straus.  
The Bankruptcy Bills—Jay L. Torrey.  
The Pooling Bill—George R. Blanchard.  
The American Merchant Marine—Chas. H. Cramp.  
H. H. Hanna, John Wanamaker, Martin A. Knapp and S. B. Elkins have been invited to speak on the Monetary Commission, A Postal Telegraph, Extension of the Powers of the Interstate Commerce Commission and A Ship Canal to the Sea, respectively, but have not yet accepted.

#### A Guess at Rolling Stock Requirements.

We have tried with some pains to get at an approximate estimate of the amount of rolling stock which the railroad companies ought to buy in the year 1897 to bring their equipment up to the normal standard of efficiency. It is obvious to anybody who knows anything about this subject that such an estimate can only be approximate. Statistics of the past are not conclusive; they only give us a starting point.

It is not difficult to find the amount of equipment per mile of railroad and the number of ton miles and passenger miles carried per mile of railroad, year by year, but the amount of equipment is only one element in its efficiency. Within a few years the car service associations have increased the movement of freight cars by an important percentage and the carrying capacity of the average freight car has been increased in the same interval. Locomotives grow heavier year by year and carry a higher boiler pressure, and each locomotive hauls more cars in a train. Now we hardly ever take up an annual report without discovering that the average trainload has increased over the year before. Furthermore, there has been a movement in the way of getting more miles out of the individual locomotive by increasing the length of the engine run. On the other hand, it is probable that the rolling stock of the country carried on the books as an asset includes more worn out and unserviceable cars and locomotives than it included four years ago, for the additions to equipment have necessarily been small. While all this is true it is possible to make an estimate which is near enough the truth to be of some interest if not of some service; and after all this is a case in which "the letter killeth, but the spirit giveth life," and we are after the spirit of the matter.

Our investigation leads to the conclusion that to put the rolling stock of the railroads of the United States on a normal basis of efficiency the orders to commercial builders in the year 1897 must amount to 2,342 locomotives, 97,246 freight cars and 5,400 passenger cars. If this is true it is worth while to compare the figures with the orders that have already been given out this year. The news columns of the



*Railroad Gazette* contain not only the latest information of probable demands by the railroad companies, but also a pretty accurate record of orders given, and we find that for the first nine months of the year the orders placed with contracting companies have amounted to 771 locomotives, 27,700 freight cars and 179 passenger cars. Only 77 railroad companies have ordered new locomotives during the year and the freight car orders have been placed by about the same number of companies. Or, if we are correct in our figures, about one-third as many locomotives have been ordered during the year as ought to be built to bring the equipment up to a proper standard, and in fact the orders have been just about one-third of the number built by the contracting companies in the year 1890. The freight cars already ordered amount to considerably less than one-third of the estimated requirements and the passenger cars to about one-thirtieth.

Probably the reader would like to know how we arrive at such an estimate. In making it we have taken the figures from Poor's Manual. From that authority we find that at the beginning of the year 1884 we had 149,183 miles of railroad, 23,623 locomotive engines, 778,663 freight cars and 16,889 passenger cars. Ten years later, at the end of 1893, the mileage had been increased 79,829 miles, or 53½ per cent.; the number of locomotives had been increased 12,863, or 54 per cent.; the freight cars had been increased 424,813, or 54 per cent.; the passenger cars 11,735, or 69 per cent. During these 10 years the average annual percentage of increase in mileage, locomotives and freight cars was substantially alike—4.4 per cent. Although the hard times began early in the year 1893, the impetus to building, both road and rolling stock, was such that the construction of that year was not largely affected. During the three following years, to December 31, 1896, however, the increase in mileage was only 2.8 per cent., less than 1 per cent. a year; and the total amount of rolling stock in service was reduced, there being at the beginning of 1897 406 less locomotives, 13,549 less freight cars and 3,836 less passenger cars than there were on Jan. 1, 1894. It would seem apparent that in order to prepare for good business, not only this shortage but also the increase due to the increase in mileage, should be supplied, which together would require 1,427 locomotives, 47,246 freight cars, 4,637 passenger cars.

But this is only part of the study. For the past seven years the *Railroad Gazette* has obtained from the contracting locomotive and car builders yearly returns of rolling stock built. The Chief of the United States Bureau of Statistics publishes year by year returns of cars and locomotives exported. If we take the net increase in the rolling stock for a year or period of years, as ascertained from the reports made to Poor, and subtract that from the rolling stock built by the contracting companies in the same period, and subtract also the amount of rolling stock exported, the remainder will be something like the quantity of rolling stock which has disappeared in filling vacant numbers—that is, which has been absorbed by the annual wearing out and scrapping of material. By this method we find that for seven years the average annual consumption of locomotives in excess of those built by the railroad companies has been 871. The freight cars have amounted to about 50,000 a year and the passenger cars to about 800. This we may put down as a normal home consumption of rolling stock for the year 1897. If we add these quantities to those which have been given above as necessary to bring the equipment up proportionately to the increase in mileage, we shall find the requirements for the year to be as given at the beginning of this article, namely, 2,342 locomotives, 97,246 freight cars and 5,400 passenger cars.

#### The New English Workmen's Compensation Act.

The "Workmen's Compensation Act," which has been pending in the British Parliament for several months, has become a law, receiving the Royal Assent on Aug. 6, and now every railroad, factory, mine, or quarry, and every concern carrying on any "engineering work" in the United Kingdom, must maintain what is substantially the same as an accident insurance department for its employees, and bear the whole cost itself. The law of 1880 remains in force, but this act of 1897 greatly enlarges the application of the principle of employer's liability. The older law gives employees the same remedy as passengers or strangers, but only in cases where the injury is due to the employer's negligence or to defects in his machinery, etc. The new law makes the employer liable for all accidents, no matter how caused, except where the injured workman is himself guilty of wilful misconduct. The fellow-servant doctrine has nothing to do with the matter either way. This latest law, however, applies only to the specific employments above named.

To receive compensation under this act the workman

must be disabled for at least two weeks. The employer is not in any degree relieved of responsibility for wilful negligence, but he cannot be made to pay both independently of and also under this act, nor shall he be liable for injury to employees, except under this act, unless he is wilfully negligent. If the registrar of friendly societies certifies that any voluntary insurance arrangement for employees is as good for the men as this law would be, the employer may continue such insurance scheme instead of obeying this act. The law applies to employees of the government, except those in the naval or military service. The law goes into effect at the beginning of 1898, and a schedule attached to the bill prescribes the amount of compensation; in fatal accidents, if the workman leaves dependants, three years' salary, or £150, whichever is greatest, but never over £300; weekly payments previously made, if any, to be deducted. If the man leaves no dependants the payment shall be only for medical attendance and burial, not exceeding £10. In non-fatal accidents a weekly payment equal to 50 per cent. of the man's wages, but not exceeding £1 a week.

The *Railway News* (London), commenting on this law, says that the accident fund of the London, Brighton & South Coast is about as favorable to the employees as the new law will be. On that road an employee has the choice of joining either of three classes and of insuring for £100 more than his class allows for accidental death. Monthly premiums are 6d., 4½d. and 3d. respectively for the three classes, and for this the members get 20s., 15s. or 10s. a week for 52 weeks, and in case of fatal accident the payment is £200, £150 or £100. Membership is voluntary, and members may retire from the association, but few or none have done so. The *Railway News* estimates that on the Brighton road two fifths of the funds are provided by the employees, a fact which it seems to ignore in making its comparisons. If the benefit payments to which an employee is entitled under the new law are anywhere near as great as under the existing associations, it is, of course, decidedly to the advantage of workmen to drop their associations, for in these they themselves have to bear at least a large share of the cost—this, of course, on the assumption that the wages rates are not reduced when the new law goes into effect.

#### Annual Reports.

*Norfolk & Western.*—The first annual report of the reorganized company covers the operations of the nine months ending June 30. The miles operated at that date were 1,569, but the figures in the report are based on an average of 1,512 miles.

The result of the nine months in gross returns was unsatisfactory, but the conditions were quite adverse, not only in general business but in the soft-coal and iron industries, which together give to the company almost two-thirds of its tonnage. The company earned \$7,732,159, of which \$4.3 percent. was from freight and the loss in the nine months was \$526,230. Freight traffic receipts fell off \$349,273, or five per cent., and passenger revenue \$161,149, or 15 per cent. But a saving of \$935,443, equal to 14 per cent., was made in working expenses and this resulted in an improvement in net of \$109,214.

Net earnings were actually \$2,104,124, and other income \$16,182, so that the fixed charges of the nine months, \$1,645,146, and \$15,311 of advances, were provided for and a balance left of \$459,848.

The earnings and expenses per mile of road were as follows on the average operated mileage, similar figures for the Chesapeake & Ohio in its last fiscal year being also added:

	Earnings and expenses per mile.	
	Norfolk & West.	Ches. & Ohio
Gross earn.....	\$5,113	\$3,556
Net earn.....	1,291	2,081
Main. way expen.....	756	1,070
Main. equip.....	1,338	1,157
Cond. transp.....	1,419	2,388

The Chesapeake & Ohio has \$3,443 more gross earnings per mile than the Norfolk & Western and \$1,290 more net earnings; but in 1897 it spent only \$233 more per mile on maintenance items, \$2,227, against \$1,994 by the Norfolk & Western.

Comparison with the Chesapeake & Ohio is fair because the two roads are in many respects similarly situated. On both roads the predominating traffic is soft coal. On the Chesapeake & Ohio coal and coke gives 46.9 per cent. of the total tonnage and on the Norfolk & Western 56.8 per cent. The soft-coal trade was in a demoralized condition throughout 1896, and both roads lost heavily in this tonnage, but the Chesapeake & Ohio, with a more diversified traffic, gained in other tonnage, and closed its year with an improvement in gross of \$487,000, or 4½ per cent., while the Norfolk & Western lost 6.3 per cent. of its revenue in the nine months.

The new fiscal year opens promisingly for the company. It profited during the summer through the coal strike in the Western States, but even since its settlement, earnings show large improvement over 1896. In July gross gained slightly and net \$53,000, while in August the increases were \$131,494, or 15 per cent., in gross and \$153,302, or 79 per cent., in net, while the

gain in the first three weeks in September is \$108,740 in gross.

The train haul on the Chesapeake & Ohio is 308 miles and on the Norfolk & Western 280.4 miles. The ton-mile rate of the Chesapeake & Ohio is lower, but not much, being 4.19 mills against 4.45 mills. Both roads have a large average train load, with the advantage again with the Chesapeake & Ohio, with its record of 352 tons, but the 325 tons of the Norfolk & Western is, as is the train haul, just the figure of the Chesapeake & Ohio in 1896. Freight train mile earnings were \$1.47 on the latter and \$1.43 on the Norfolk & Western. Taking the report of the latter company for 1895 we notice freight train-mile earnings of but 96.8 cents on a ton mile rate of 4.66 mills, so that a material advance has been shown on this unit.

*Southern Railway.*—In each year since the company took over the properties of the Richmond Terminal system it has added to its mileage, so that it has not been possible to make exact comparisons of the income account alone without taking into consideration the difference in mileage. During the year, which closed June 30, and for which the report has just been issued, the company increased its average operated mileage from 4,574 miles to 4,806. The income account shows gross receipts of \$19,082,247; net traffic earnings of \$5,630,799, and other income of \$188,508. Interest and rentals called for \$5,218,370, and other charges for \$44,459. The balance carried to profit and loss was \$556,478.

As the question whether the directors will repeat their action of last fall and declare another dividend on the preferred stock is one concerning which a good deal of talk goes on more or less continuously in Wall street, it is worth noticing that this balance is just about enough to pay a one per cent. dividend on the preferred, which would call for \$543,000. We have no knowledge what the action of the directors will be in this matter. But it is at least worth while to point out that although the development of the property has been in some respects remarkable there is much yet to be done. Fixed charges in 1897 were nearly \$400,000 above the 1896, and the maximum has not yet been quite reached, the reorganization plan providing for a rising scale of interest on certain bonds. Looking broadly, we may be certain that the directors will not authorize any dividend disbursement without quite positive assurances of an important and steady improvement in earnings.

As compared with 1896 gross earnings show a decrease of \$2,747; working charges were reduced \$218,292, and net earnings were \$215,544 more, and through increased miscellaneous receipts the total available income was \$6,133,176 or \$313,869 over the 1896 total. But charges, etc., increased \$424,428, so that the surplus is \$110,589 less than the \$556,478 reported in 1897. The general manager's report gives a comparison of earnings and expenses for substantially the same mileage in the two years as follows:

Earnings:	1896.		Inc. or Dec.	
	1896.	1897.	Per cent.	
From Freight.....	\$12,118,117	\$12,386,902	I. 1.96	
" Passengers.....	5,347,845	4,832,848	D. 9.63	
" Mail.....	942,183	1,110,063	I. 17.78	
" Express.....	378,538	428,561	I. 13.21	
" Miscellaneous.....	429,264	321,127	D. 25.21	
Total earnings.....	\$19,246,552	\$19,079,500	D. 0.87	
Expenses:				
For Conduct. Transp'n.....	\$6,855,526	\$6,745,999	D. 1.30	
" Maint. of Way & Struc.....	3,421,253	2,929,190	D. 14.72	
" Maint. of Equip.....	2,110,866	2,250,768	I. 6.63	
" Gen'l. Exp. and Taxes.....	1,197,740	1,316,201	I. 9.88	
Total expenses.....	\$13,585,432	\$13,233,156	D. 2.61	
Net earn. from oper.....	5,658,120	5,846,344	I. 3.33	
P. c. of expen. to earn.....	70.60	69.35		

The large decrease in passenger revenue is partly due to the fact that comparison is made with a period which includes the heavy travel to the Atlanta exposition. For the same reason there was a better passenger rate, 2.372 cents per mile. While the passenger revenue decreased 9.6 per cent., passenger mileage was 49,229 thousand miles, or 19.46 per cent. less. The company got a longer haul on its freight, 169.8 miles against 154.2 miles, and increased its ton-mileage 100 million miles, or 8.76 per cent., in spite of a decrease of 1.2 per cent. in the tonnage of commercial freight. The freight earnings increased, too, although rates fell off, as well as tonnage. The ton-mile earnings were 9.76 mills against 1.034 cents in 1896. The train load shows constant improvement. It was 144.4 tons in 1894, 160.7 in 1896, and is now 172.8 tons. Including company freight, ton-mileage increased 151 million miles, or 10.85 per cent., but train-mileage only 2.17 per cent.

Comparing the balance sheets of the two years we find cost of road, June 30, 1897, stated as \$254,133,245, an increase of \$2,462,215, mostly in leasehold estates. The cost of equipment now stands at \$11,467,454, against \$11,323,401. The company owns \$16,508,000 of securities, including \$1,701,000 of its own bonds held in the treasury; pledged and also including \$412,495 of deferred but secured bills receivable, an item which does not appear in the 1896 report. Material on hand is valued at \$958,000. Current assets are \$4,185,342, which includes \$2,177,000 cash held by treasurer and by financial agents. As compared with 1896 there is a decrease of \$813,000 in current assets. Current liabilities have decreased \$425,000.

*Erie Railroad.*—The report for the year ending the 30th of last June is the second since the reorganization. The two points of greatest interest which appear are the record of continued improvement and enterprise and the demonstration of the fact that "the company could comfortably earn its fixed charges during a year when business of all kinds, and especially the iron industry



was suffering from a depression and an uncertainty as to the future as great as is likely to exist." The gross revenue from operation amounted to very nearly 31½ millions. The operating expenses and taxes were 23½ millions. The net income from operation, plus the income from securities owned, etc., sufficed to pay interest and rentals to the amount of \$8,126,283 and to make a balance of \$352,019 to carry over. The main results of operation are shown in the table below. This is on an operated mileage of 2,163, 30 per cent. of which is double track.

Earnings:	1896.	1897.	Inc. or Dec.
Freight.....	\$16,766,499	\$16,609,449	D. \$157,050
Coal.....	6,660,417	6,867,135	I. 206,668
Passenger.....	6,049,754	5,742,807	D. 306,947
Mail.....	397,059	464,980	I. 67,921
Express.....	572,244	574,180	I. 1,936
Rents.....	211,991	132,477	D. 79,513
Miscellaneous.....	987,493	1,106,062	I. 118,569
<b>Total earnings.....</b>	<b>\$31,615,487</b>	<b>\$31,497,031</b>	<b>D. \$118,456</b>
Expenses:	1896.	1897.	Inc. or Dec.
Maintenance of way and structures.....	\$3,314,922	\$3,089,609	D. \$225,314
Maintenance of equipment.....	4,476,120	4,387,392	D. 88,727
Conducting transportation.....	11,633,307	14,294,818	D. 338,459
General expenses.....	585,362	676,326	I. 90,964
Taxes.....	709,692	884,197	I. 174,505
<b>Total expenses.....</b>	<b>\$23,719,403</b>	<b>\$23,332,243</b>	<b>D. \$387,161</b>
<b>Net earnings from operation.....</b>	<b>7,920,083</b>	<b>8,164,788</b>	<b>I. 238,704</b>
<b>Ratio of expenses to earnings.....</b>	<b>74.95%</b>	<b>74.08%</b>	

The loss in freight (other than in coal, which gained) was entirely in tonnage. The rates were the same as the year before, namely, 6.25 mills, but the tons carried fell off 9½ per cent., and the ton-miles declined nearly one per cent., or 24½ millions in amount. Obviously the haul must have increased, as it did, from 230½ miles to 251½.

But while the company lost earnings on merchandise freight, this loss was more than made up in the coal freight. Here the tons carried fell off 5.81 per cent. to an aggregate of 9,550,000 tons of anthracite, bituminous and coke, but as the haul increased from 130.7 miles to 134.07, the ton-miles declined only 3.38 per cent. But the gain in earnings was due to a better average rate, namely, 5.36 mills, as against 5.02. This increase in coal rate was sufficient to raise the average ton-mile rate of all freight carried on the system from the 5.84 mills of 1896 to 5.96 mills, and to make the total gross earnings from freight about \$50,000 more than last year, in spite of the considerable decline in merchandise freight.

The ton-miles of all freight carried amounted to 3,940 millions; the year before they had been 4,009 millions. In passenger traffic there was a falling off in the number carried, in the passenger miles and in the rate. We have seen that the passenger earnings decreased \$307,000 or 5.07 per cent. The passenger miles, which were 370 millions, were 3.91 per cent. less than the year before and the rate (1.552 cents) was 1.21 per cent. less.

But looking back to the table, it will be seen that the saving in working expenses was so great that a handsome gain was made in net. The largest saving is in the item of conducting transportation. Of course a considerable part of this saving was from the smaller tonnage, and this appears all through the items of wages and fuel, etc.; but we discover in the report the very significant fact that while the tons fell off 7.64 per cent. and the ton-miles 1.73 per cent., the freight-train mileage decreased 10.53 per cent. The average cars per train increased, and the average number of loaded cars increased, and the train load gained 24.71 tons and reached the very creditable figure of 276.19 tons. Of course a variety of elements have entered to bring about this result. The equipment has been improved and tracks have been improved, engine runs have been lengthened, and the system of rating engines by tons instead of by cars has been established "with a gratifying reduction in the detentions of traffic," and doubtless also with considerable influence on the average train load.

The decrease in the item of maintenance of way and structures has been in spite of a good deal of new work charged to working expenses. Evidently a considerable saving has been made in the wages account here. The average number of trackmen, including extra gangs, and the average number of sectionmen shows a decrease equal to one man for every 10 miles of road. Nevertheless, during the year 2,877 tons of 90-lb. rail and 7,093 tons of 80-lb. rail were laid, and 1,097,000 cross ties were put in track, and a good deal of other work was done in the way of actual improvements in permanent way.

In maintenance of equipment there was a saving of \$88,727 over the year before. Nevertheless, locomotive improvements to the amount of \$247,000 were charged to working expenses and 1,150 30-ton box cars were bought, a large portion of which have been paid for and also charged to working expenses. Tenders and freight cars were equipped with over 4,000 M. C. B. couplers and 845 air brakes, all of which again was charged to working expenses. It is quite apparent from this, as we also know from observation, that the equipment of the system is steadily improving, and, in fact, has come to be very efficient.

In the general remarks of the President is some interesting information; as, for instance, that a contract has been executed between the company and the officials of Jersey City for the separation of grades, which embraces, besides the elimination of all grade crossings between the tunnel and the ferry, provision for building two or more additional tracks over or through Bergen Hill. Mention is also made of the very important work now going on on the New York & Greenwood Lake in the way of double tracking, new bridges, etc., which work is des-

tinued to convert this into one of the finest suburban railroads in the neighborhood of New York City.

The President ends by calling attention to the fact that a great deal must yet be done toward reducing the cost of transportation. The volume of cheap traffic is so great that money can only be made by the greatest skill and care in handling it. He also calls attention to the unjust increase in assessments for taxation and to the bad effect of recent decisions on the possible conduct of railroad affairs.

**Louisville & Nashville.**--The annual report for the year ending June 30, 1897, of which we have received an advance copy, shows that the company was able to maintain its earnings fairly well. The income account shows no changes from the summarized figures which were published in July. Gross receipts fell off \$18,403, the mileage having increased from 2,965 to 2,981 miles. Working expenses also were larger by \$344,012, so that the loss in net earnings was \$362,415. Or with a decrease of but 0.8 per cent. in gross income expenses were 2.5 per cent. larger, resulting in a decrease of 5.2 per cent. in net receipts. But even with this loss the company is able to show its full charges earned, and a balance of \$979,180. This compares with a surplus of \$1,377,503 in 1896; \$700,585 in 1895, and of \$1,552,490 in 1894. The company, therefore, in the last four years of poor earnings, has been able to show an average annual surplus above all charges of \$1,152,439 more than enough to pay two per cent. dividends each year. Such a dividend would call for \$1,056,000. Even in 1897 a sum only \$77,000 short of two per cent. on the stock was earned. This is after deduction of large amounts in each year for improvements charged against earnings. The company, four years ago, closed its construction account, a course which is being followed one by one by other companies. This year the Chesapeake & Ohio and Big Four companies have taken the same action. Only a few years ago it was a distinction of the Lake Shore that it had no open construction account and charged the cost of all improvements to current expenses. Since 1894 the Louisville & Nashville has spent an average of \$481,000 annually on improvement account out of earnings. Since 1894 \$1,444,000 has been so spent, almost equal to what a three per cent. dividend on the stock would call for. We speak of all this with such particularity because the company is one of those non-dividend paying roads which Wall Street associates with dividend possibilities. It is quite generally accepted that between now and January the company will be put on a three per cent. basis by the declaration of a 1½ per cent. dividend. Since July 1 earnings have been steadily increasing, and in the three months to Sept. 30 are \$432,000 ahead of 1896 in gross. In net the gain in July and August was \$261,467, or 27.2 per cent. On the other side, however, is the undoubted fact that large additional sums could be spent on the property and the equipment to advantage in reducing the cost of transportation. The company so far has not been able to make as much progress in this direction as some other roads.

Gross earnings per mile were \$6,834 in 1897, something larger than in 1894 or 1895, but less than in any other year since 1884, except 1886, when they fell to \$6,728. Net earnings were only \$2,118, a loss of \$134 as compared with 1896, and of \$1,261 as compared with the company's best total, made in 1890. It is, as a matter of fact, the lowest net earnings per mile reported in 20 years. The recent operations of Louisville & Nashville have been marked by a constant growth in the operating ratio, which brings us to a consideration of the operating expenses and we need go no further back than 1894. Since that year nearly 1½ million dollars has been spent on improvements out of earnings which formerly would have been made a capital charge. The principal items for which this sum was spent are collated in the following table by years:

	1897.	1896.	1895.	Total.
Side tracks.....	\$79,333	\$109,158	\$50,078	\$238,569
Tunnels.....	18,390	73,074	10,932	102,396
Bridges.....	8,195	19,090	10,975	38,560
Filling trestles.....	31,518	10,851	810	43,179
Rails.....	71,108	91,984	41,997	205,089
Ballast.....	154,341	76,250	25,496	246,087
Buildings.....	76,169	60,192	34,721	171,022
Locomotives.....	31,736	.....	.....	31,736
Safety appliances.....	17,000	71,111	61,289	149,400
Fences.....	28,130	28,164	23,385	81,779

The amounts set opposite to rails indicate the excess value of the new rails over the lighter sections replaced.

In comparing the details of operating expenses, the accounts as given in the recent annual reports cannot be fairly taken, because the extraordinary improvements have been included in general expenses and not divided between maintenance of way and maintenance of equipment. Therefore those two accounts have not shown the total sums spent on the property. Through the courtesy of the officers we are enabled to give the following comparative statement of operating expenses, in which the improvement charges have been deducted from general expenses and properly apportioned between the two maintenance accounts. In the 1897 report cost of improvements has been adjusted between these accounts for the first time:

	1897.	1896.	1895.
Maintenance of way.....	\$3,354,767	\$3,176,105	\$2,527,500
Maintenance of equipment.....	2,384,115	2,346,338	2,208,042
Conducting transportation.....	7,003,746	6,895,611	6,539,774
General expenses.....	1,104,580	1,087,162	1,012,456
<b>Total.....</b>	<b>\$13,849,218</b>	<b>\$13,505,206</b>	<b>\$12,277,772</b>

In three years, then, maintenance of way expenditures have been increased \$827,267, or 32.7 per cent. Equipment charges do not show a like growth. The increase is only \$176,000, or 7.9 per cent.

The increasing proportion of the expenses, which the company has been spending in improving its property is well shown in the following table giving the percentage which each of these significant items of expenses bore to the total working charges in 1895 as compared with 1897:

	1897.	1895.
Maintenance of way.....	24.2	20.5
Maintenance of equipment.....	17.2	17.9
Conducting transportation.....	50.6	53.1

The high relative cost of handling traffic is partly explained by the large proportion of empty car mileage run on the Louisville & Nashville. It has not yet been able to make much progress in developing a traffic which would employ its cars both ways, and on much of the freight it hauls it has no compensating return load. There is retrogression on the Louisville & Nashville in those items of traffic where most roads are showing improvement, which must be attributed to peculiarities of traffic or physical conditions, which other companies do not have to contend with. The change in trainload is inconsequential; there is actually a loss in train-mile earnings; the average train contains less loaded cars; the empty car mileage is proportionately greater; the average car-mile run brings in less revenue. We append certain traffic statistics bearing on these points for 1895 and 1897.

	1897.	1895.
Aver. train loads..... (tons)	175.94	177.9
Aver. train haul..... (miles)	77	79
Freight train-mile earnings.....	\$1.44	\$1.505
Net ton-mile earnings.....	.412	.497
Aver. car load..... (tons)	13.16	12.7
Earn. per car mile..... (cents)	7.053	7.467
Net earn. per car mile..... (cents)	2.018	2.451
Per cent. loaded car mileage to total car mileage.....	66.59	69.45
Ton-mile rate..... (cents)	.805	.816
Net ton-mile rate.....	.230	.279
No. loaded cars per train.....	13.6	14.

The ton-mile rate compares with a rate of 9.36 mills on the Southern.

The decision of the Interstate Commerce Commission in the complaint of the New York, New Haven & Hartford against the New York & New England, reported in the *Railroad Gazette* of Sept. 3, was not unanimous; Commissioner Clements dissents. The majority, it will be remembered, held that the New England road, in making through rates on coal to points on the New Haven road, which the latter had not agreed to, violated the law, the New England's proportion to the junction (which was added to the New Haven's regular local rate from the junction) being much less than its published rate to the junction. The through rate was duly published. Technically the claim of the New Haven was sound, and the decision was based mostly on technicalities; but Commissioner Knapp justified his conclusion by the declaration that practice like the New England's, if allowed to continue, would prove to be an effective means for disturbing rates; a road could seriously injure a competitor without benefiting the public. Attention was called to the well-known fact that our law, unlike that of Great Britain, omits to empower the Commission to compel joint through rates where the railroads are unwilling. The dissenting commissioner agrees with the majority so far as to condemn the omission to publish figures showing what proportion of the through rate was to go to each of the two roads; but if the rate to the junction had been shown on the tariff, he thinks that the through rate, being then a combination of two locals, would have been lawful. In other words, he would justify the New England in charging to Hartford a lower price on coal destined to Thompsonville than on that for Hartford proper, if Hartford dealers suffered no damage. This would not be different in principle from the practice of the Western lines in making rates to the Mississippi River, for goods going to Colorado or California, which are lower than those for other places not so far off. This custom simply serves to save the work of getting up a lot of unnecessary through tariffs, and has always been held lawful; and this without regard to whether the road west of the Mississippi also made a reduction from its local rates. The Commission has never found fault with railroads for dividing a through rate between themselves unequally. Mr. Clements also combats the idea that the New England's action did not benefit the public. It did not reduce the cost of coal to the consignees; but it may have prevented an advance. Again, the shippers are a part of the public, which must be taken into consideration, as well as the consumers. The Newburgh shippers could not send coal into Connecticut by the New Haven road from New York. In his conclusion Commissioner Clements says:

"The rule laid down in this case, if generally applied, will necessarily result in greatly increased combination rates and seems to me to require an interpretation of the statute which will be in unreasonable restraint of commerce, destructive of fair competition and promotive of monopoly in the carrying business, detrimental to the public interests and contrary to the very object and principles of the law itself. Neither the provision of the statute nor its purposes raise any implication against the method of rate making in question but, upon the contrary, both necessarily favor it. The instances in which the right claimed by the defendant might lead to abuses are extreme and not of probable occurrence. In any event, the Commission, under the rule that the route shall be 'reasonable' and the through rate 'in the interest of the public,' would have the power to prevent or correct such abuses. On the other hand, the in-



jurious consequences of a denial of the right, which find illustration in this case, will be remediless."

Press reports from the Southern States, concerning the interruption of passenger and freight traffic on the railroads in consequence of the yellow fever quarantines, which have been numerous for the past month, continue to be as vague as ever, and it is very difficult to get any definite information as to how seriously the railroads have been affected. The three principal railroads operating in Alabama and Mississippi seem to look upon their losses as of much less consequence than would appear from the statements in the newspapers. The Illinois Central has continued right along to run two through passenger trains daily each way between Chicago and New Orleans. The Yazoo & Mississippi Valley has taken off its through night train, but this is an Illinois Central line, and except when traffic is heavy this night train may be considered in some sense a duplicate of that on the Illinois Central proper. Some local trains appear to have been taken off on all the roads, but we cannot locate the road or roads on which "all traffic is suspended." Local freight business has been considerably disturbed, but in many cases a falling off in shipments to or from one center is partially or wholly made up by increase in shipments from some other source of supply. Atlanta papers have stated that freight cars are being disinfected there by wholesale, 50 gals. of chloride of mercury solution being used to each car. We cannot make out, however, whether this troublesome process was continued for any length of time; local Boards of Health in many cases make their regulations too rigid, and after a few days modify them. The reports of earnings for August showed no very serious losses by the larger roads, there being in some cases increases instead, the companies having much larger interests outside the quarantine territory than within it. September earnings have not yet been reported.

Arizona is enjoying a remarkable boom in "paper railroads." Last winter the Legislature passed an act to the effect that all new railroad lines upon which active work should be begun within one year from the date of the passage of the act are to be exempt from all county, municipal and territorial taxation for 15 years. A further provision is that at least 10 miles of new road must be completed each year in order to continue in the exemption privileges. Recently the time expired for filing intentions to build new lines under this act, but before that limit was passed papers for no less than 31 separate projects, calling for building about 3,000 miles of new road, had been filed with the Territorial Secretary. One company leads with a proposition for 878 miles of railroad, tapping nearly every sandheap in the territory. Another company proposes to build over 400 miles and several others more than 100 miles each. We observe that railroad building has been a little slow in Arizona during recent years. In the year 1896 and up to the present time in 1897, so far as can be learned, no additional road has been built in the territory. In 1895 there were 65 miles built and 194 miles in 1894. Arizona now has 1,412 miles of railroad, while Massachusetts, with less than one-thirteenth the area, has 50 per cent. more mileage. But whatever may have been the theory in the past, the men who furnish the capital to build new roads do not now measure the opportunities by mere extent of territory. The 2,114 miles of railroad in Massachusetts serve a population 30 times as large as that of Arizona. Measured on the basis of population, Arizona has more mileage than any other state or territory in the Union and eight times the ratio for the whole United States. The territory may perhaps have a good deal of new road in the near future, but it will not be simply because such property will be exempt from taxation for the next 15 years. The increase will come with substantial gains in population, in industrial prosperity and in security for investments, or not at all.

#### TECHNICAL.

##### Manufacturing and Business.

M. Greenwood has been appointed a sales agent for the Laidlaw-Dunn-Gordon Co., of Cincinnati, O., with office in the Carnegie Building, Pittsburgh. Mr. Greenwood was for some years Superintendent of the Hall Steam Pump Co., of Allegheny, Pa.

Wm. Sellers & Co., Incorporated, of Philadelphia, Pa., have received an order from the Bethlehem Iron Co. for one 75-ton traveling crane with a 20-ton auxiliary hoist; one 20-ton traveling crane with a 5-ton auxiliary hoist and one 10-ton traveling crane.

In our issue of Sept. 17 we noted the incorporation of the Illinois Car & Equipment Co. This company has been formed to take over the property of the United States Car Co. at Hegewisch, Ill., and Anniston and Decatur, Ala. O. M. Timson, of Anniston, has been appointed General Superintendent of the southern works.

U. S. staybolt iron, made by Brown & Co., Incorporated, Pittsburgh, Pa., has been specified for the six engines ordered by the Iowa Central from the Pittsburgh Locomotive Works.

The E. P. Allis Co., of Milwaukee, Wis., reports the following foreign orders recently received and aggregating \$500,000: Six engines of 1,500 H. P. each, for the London Central Underground Electric Railroad; six engines for the Dublin tramways, of 1,000 H. P. each, to furnish power for electric cars; three engines, of 1,000

H. P. each, for Barcelona, to supply power for electric tramways; two duplicate engines for the Madrid, Spain, tramways; four engines, of 1,500 H. P. each, for the Sydney, New South Wales, tramways, and three compound direct coupled engines for Paris, France.

The Carnegie mills have recently added Eberhardt's automatic gear cutters, 74x14-in., made by Gould & Eberhardt, of Newark, N. J., for their large work, also a 30-in. spur, bevel and worm gears for their smaller work. These machines possess improvements in automatic mechanism never before put on the market. They were supplied with cutters specially adapted for automatic machines.

The Bureau of American Republics is informed, through the Mexican Legation, that bids, in competition, for designs for the Federal Legislative Building of Mexico must be submitted not later than Nov. 30 next. The bids may be sent either to the Department of Public Works at the City of Mexico direct, or delivered at the diplomatic or consular offices abroad, up to the date mentioned. Plans and specifications of the building may be procured from the Bureau of American Republics, Washington, D. C.

The Oral Brake Beam Co. has been organized at Portland, Me., for the purpose of making and dealing in brake beams and other railroad appliances and supplies. The officers are: President, Frank R. Toby, of Philadelphia, Pa., and Treasurer, James O'Neil, of Philadelphia. The capital stock is \$150,000.

The report of the Michigan-Peninsular Car Co. for the fiscal year ended Aug. 31 shows earnings from all sources, \$176,669; interest on first mortgage bonds, \$100,000; balance, \$76,669; dividends on preferred stock, \$50,000; surplus, \$26,669. The balance sheet as of Aug. 31 shows assets, plants, \$7,720,536; construction, \$24,478; common stock unissued, \$1,000,000; cash on hand, \$336,148; bills receivable, 266,001; sundry amounts due, \$421,324; materials on hand, \$772,060; miscellaneous, \$1,274; total, \$10,541,821. Liabilities, preferred stock, \$5,000,000; common stock (\$1,000,000 unissued), \$3,000,000; first mortgage bonds, \$2,000,000; pay rolls (paid Sept. 10), \$27,196; accounts for material, not yet due, \$189,439; excess assets, \$325,186; total, \$10,541,821.

The Erie City Iron Works, of Erie City, Pa., is building four large boilers for the Lake Shore & Michigan Southern Railroad for use at Elkhart and Chicago. They will be 76 in. in diameter and 30 ft. long. The Union Iron Works is also building a battery of boilers for the same company for use in Buffalo. This battery has 67-in. shells, and the boilers are 25 ft. long.

A formal petition has been made for a dissolution of the Boies Steel Wheel Co., of Scranton, Pa., which was absorbed by the Steel Tired Wheel Co. last May.

The Lancaster Fender Co., of Lancaster, Pa., has been organized to make a patent fender for electric cars. The directors and officers are: H. Burd Cassell, John D. Skiles, H. L. Trout, S. K. Yundt, R. J. Evans, W. J. Fordney and E. L. Reinhold; President, H. Burd Cassell; Secretary, R. J. Evans, and Treasurer, S. K. Yundt. The company has received an order to equip a number of cars for the Pennsylvania Traction Co.

R. H. Soule, of the Baldwin Locomotive Works, sailed for England in the St. Paul Oct. 6. Mr. Soule will spend about two weeks in London and go from there to the Continent on business for the Baldwin Locomotive Works.

The Baldwin Locomotive Works will build an addition to its machine shop on the west side of Broad street, from Pennsylvania avenue to Hamilton street, Philadelphia. It will be 138x85 ft. and three stories high.

The J. C. McNaughton Co., Bourse Building, Philadelphia, Pa., has received the contract to furnish all the poles and ties for the Greene County Traction Co., of Coxsackie, Pa.

The National Switch & Signal Co., of Easton, Pa., now has in use a machine for making pins for interlocking apparatus which is so efficient and turns out work so cheaply that the company has secured an order for 20,000 pins to go to England. The pins, though used for outdoor connections, are turned so as to make a very accurate fit, and they have square heads.

##### Iron and Steel.

Zug & Co., of Pittsburgh, are equipping their plant to roll black sheets for tinning. Wm. Swindell & Bros., of Pittsburgh, are building two gas producers and a heating furnace; an annealing furnace and a pickling vat are also being added. An order has been placed with McIntosh, Hemphill & Co. for two additional stands of rolls. Other improvements in the plant include the installation of an electric light plant and electric cranes, and the building of a large warehouse, increasing the capacity of the plant one-half.

The West Leechburg (Pa.) Iron & Steel Co., recently formed, has awarded a contract to Riter & Conley, of Pittsburgh, for building its plant. The main building will be of structural iron, 225 x 100 ft., with a large shed. The officers of the company are: President, Capt. A. Hicks; Vice-President, J. W. Kirkpatrick, and Treasurer, J. L. Kirkpatrick.

J. H. Sternbergh & Sons, makers of bolts and nuts, will add a new forging department to its works at Reading. The building will be 100 x 110 ft.

The American Tube & Iron Co., of Youngstown, O., has notified its employees that wages will be increased 10 per cent., to take effect Oct. 25. This restores the reduction made several months ago.

It is stated that the Colorado Fuel & Iron Co. will build a large addition to its plant at Pueblo, Col., for making structural, bar and sheet iron.

The Fishback Mills, at Pottsville, Pa., have been reorganized and will probably resume work shortly.

The large anthracite furnaces at New Ringgold, Schuylkill County, Pa., are being torn down to make room for new buildings, which will be equipped with improved machinery.

The Temple (Pa.) Iron Co. has begun work on a new blast furnace.

The stockholders of the Akron Iron & Steel Co., Akron, O., have decided to sell the property. It is expected that a new company will be organized to put the plant in operation and to rebuild the shafting department, which was burned last July.

Miller Bros. & Co., engineers and contractors of Pittsburgh, Pa., who about a year ago built a complete pipe mill for the Maripol-Nicopol Mining & Metallurgical Co., at Maripol, Russia, have received a contract to build a blast furnace and do considerable other work for an extension of the original plant. James C. Miller sailed for Russia Sept. 29 to superintend the work.

The rolling mill of S. R. Seyfert & Co., at Seyfert, Pa., resumed work Oct. 4, after an idleness of nine months.

The Totten & Hogg Iron & Steel Foundry Co., of Pittsburgh, has received an order to build and equip a new tin plate plant at Johnstown, Pa., for J. W. Place & Co., of New York City.

The repairs to No. 3 blast furnace of the E. & G. Brooke Iron Co., of Birdsboro, Pa., are now finished, and it is expected that it will be put in blast in Nov. 15. The capacity of the furnace has been increased from 125 to 150 tons a day.

Four of the six furnaces at Sharpsville, Pa., are running, and the Sharpsville and Douglass furnaces are being put in shape for blast this month.

The Shiffler Bridge Co., of Pittsburgh, has been awarded a contract to build a large tin plate mill at New Castle, Pa. The plans provide for a main building, 1,659x100 ft. and another building 700 x 60 ft., with several smaller structures, to cost in all about \$800,000. Among those connected with the new company are William Patterson, President of the National Bank of Lawrence County, Pa.; John Stevenson, Manager of the New Castle Wire Nail Co.; William E. Reis, of the Shenango Valley Steel Co., and Rufus Patterson.

Plans have been prepared for a reorganization of the Pottsville (Pa.) Iron & Steel Co., which went into the hands of a Receiver several months ago. It is proposed to issue \$350,000 first-mortgage bonds with which to rehabilitate the mill and for a working capital. The preferred creditors will be given second-mortgage bonds to satisfy their claims of about \$150,000, which they have agreed to accept. The unpreferred creditors will be given preferred stock to the amount of their holdings, which aggregate \$450,000.

The mills and furnaces at Sharon, Pa., are working to their fullest capacities. At the Sharon Iron Works this week 36 puddling furnaces, a 12-in. mill, double turn bar mill, 8-in. mill, jobbing mill and four sheet mills are running, and it is stated that the company has enough orders booked ahead to keep the large plant running steadily all winter. The steel mill is also working full in every department.

##### New Stations and Shops.

The new station of the New York, New Haven & Hartford at Providence, R. I., illustrated and described in our last issue, will be opened to the public Oct. 10.

Bids are being asked for building a 24-stall roundhouse for the Atchison, Topeka & Santa Fe at Cleburne, Tex.

A new passenger station will probably be built by the Bennington & Rutland at Bennington, Vt. The plans call for a main building 38 ft. x 58 ft., with an annex 24 ft. x 38 ft.

Work will soon be begun on the building of a new station in St. Louis for the Wabash Railroad. It will be located at the southwest corner of Vandeventer avenue and Bernard street. The building will be 100 x 350 ft., of Indiana blue Bedford stone and granite brick, with terra cotta trimming. The corner of the building will have a tower 55 ft. high, with eaves drooping 6 ft. over the building line. The general waiting-room will be on the ground floor, while the second story will contain waiting-rooms, ticket office, baggage-room and telegraph office. The interior of the station will be finished in marble and the platforms outside will be protected by iron sheds. The specifications call for the finishing of the building within 10 months.

The Atchison, Topeka & Santa Fe road has just completed the new transfer elevator at Winfield, Kan., which was commenced in May. This elevator has a capacity 150,000 bushels.

##### A Big Coal Washing Plant.

Cunningham & Co., of Cincinnati, have just closed a contract with the Rochester & Pittsburgh Coal & Iron Co. to erect at Punxsutawney, Pa., a plant for washing coal which it is said will be the largest and most complete in the United States. The contract includes an 800-ton Luhrig washery and a 2,000-ton washed coal storage bin with conveyors and elevators for automatically handling the coal from the time it leaves the tippie until it is delivered to the car for shipment, or to the larry for coking. Negotiations for this plant have been pending since early in the year. During this time Mr. Lucius W. Robertson, of the Pittsburgh & Rochester Coal & Iron Co., has investigated the various processes for



washing coal in use at different places, with the result that the Lubrig process has been selected. The success of the Alandria washery at Crabtree, Pa., is said to have been one reason for this selection. The plant is to be so arranged that the fine coal under  $\frac{1}{8}$  in. will go to the coking coal storage bin, and the balance into separate bins, as No. 1, No. 2 and No. 3 nut coal for shipment. Bins of six carloads capacity will be provided in the washery for this purpose, or the clean nut coals can be crushed, reworked and sent to the coking coal storage bin, if the entire product is to be coked. All slaty coal will be taken out and put into a separate bin for use in generating the steam needed at the mine for hoisting, washing, etc. The contract calls for the completion of the entire plant by Feb. 1, 1898. The Link-Belt Machinery Co., of Chicago, who are engineers for Cuninghame & Co., will supply all the machinery for the plant and are now engaged on the plans. Ground will be broken at once and it is expected that some of the machinery will be ready for shipment in 30 days.

#### Launch of Another Caisson for the New East River Bridge.

The caisson for the south foundation for the New York tower of the new East River bridge was launched from the foot of North Second street, Brooklyn, on Sept. 30. It was towed across the river to the foot of Delancey street, New York, where it will be sunk. This is the second caisson built for the New York tower foundations, the other one having been launched on May 15.

#### Rails for Japan.

The Imperial Government Railways of Japan have placed an order with the Illinois Steel Co., of Chicago, for 30,000 tons of rails for delivery by July 1, 1898.

#### Widening Gage on Curves.

At the Richmond meeting of the American Railway Association a resolution was adopted authorizing the Committee on Standard Wheel and Track Gages to ascertain the practice as to widening the gage on curves. A circular letter was sent out, and the report of the committee consists in a compilation of the answers to this circular. The committee said at the outset that it did not hope to be able to formulate an exact standard, since this practice must remain largely a matter of judgment. In submitting this report now the committee says that its expectations have not changed, and the information summarized is presented without recommendation. The formation is of some interest, and those answering have occasionally taken pains to discuss the matter somewhat, but the essential facts are summed up in the able.

#### THE A. M. RAILWAY ASSOCIATION ON WIDENING GAGE ON CURVES.

The increase commences with	Range of increase.	Maximum increase.
1" on 18 roads	1" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{4}$ in. on 5 roads
2" on 5 roads	2" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{3}{8}$ in. on 2 roads
3" on 15 roads	3" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{3}{8}$ in. on 1 road
4" on 10 roads	4" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 30 roads
5" on 16 roads	5" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{5}{8}$ in. on 5 roads
6" on 7 roads	6" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{3}{4}$ in. on 24 roads
7" on 3 roads	7" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{7}{8}$ in. on 2 roads
8" on 1 road	8" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 2 roads
9" on 2 roads	9" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
10" on 2 roads	10" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
11" on 1 road	11" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
12" on 1 road	12" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
13" on 1 road	13" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
14" on 1 road	14" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
15" on 1 road	15" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
16" on 1 road	16" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
17" on 1 road	17" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
18" on 1 road	18" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
19" on 1 road	19" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
20" on 1 road	20" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
21" on 1 road	21" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
22" on 1 road	22" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
23" on 1 road	23" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
24" on 1 road	24" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads
25" on 1 road	25" increase $\frac{1}{8}$ in. to $\frac{1}{4}$ in.	$\frac{1}{2}$ in. on 8 roads

Twenty-five roads report no increase of gage on curves.

#### Rails for New South Wales.

According to newspaper dispatches, the government of New South Wales found such difficulty in placing in England an order for 2,000 tons of rails of high carbon quality that it was compelled to place it in America at \$25 a ton.

#### THE SCRAP HEAP.

##### Notes.

A Sedalia (Mo.) newspaper reports that 40 or more freight brakemen of the Missouri Pacific have been dismissed for accepting money from tramps whom they permitted to ride on the trains.

On the Boston & Maine, where passenger brakemen, at each stopping place, remind passengers who are leaving the cars not to forget their packages and umbrellas, it is said that the lost-property office has experienced a marked diminution in the volume of business done.

A passenger train of the Chicago, Rock Island & Pacific was stopped by robbers 10 miles north of Chickasha, I. T., on Oct. 1, in broad daylight, and the passengers and trainmen robbed of about \$300 in money and other valuables. Heavy charges of dynamite were exploded on the express company's safe, but it successfully withstood them.

The Grand Jury of the Superior Court of Raleigh, N. C., acting on instructions from a Populist judge, has found bills of indictment against officers of the Seaboard Air Line and the Southern Railway for issuing free passes to various public officials and others. The enforcement of the law concerning passes has never been attempted before.

A clerk in the general office of the Albany (Street) Railway Co., five conductors and one other man have been arrested for defrauding the company by using tickets a second time. The clerk in the general office sold packages of cancelled tickets to the conductors, who then turned them in in place of cash fares collected. These operations had been going on for several months.

The Boston paper which originally published the sensational story of shortages in the freight department of

the Fitchburg Railroad, due to rebates or other irregularities in the freight accounts, has published on its editorial page a statement that the report of the expert accountants and the action of the Board of Directors completely exonerate General Freight Agent A. S. Crane and his department, which it was found had been conducted in an upright and irreproachable manner.

The State Railroad Commissioners of New York have refused the applications of two electric railroads for leave to lay tracks at grade across the line of the New York, Ontario & Western, and the Rome, Watertown & Ogdensburg, at Oswego. A similar application has been denied at Olean, N. Y. At Babylon, L. I., permission has been given to construct a highway across the railroad track, the object being to abolish an existing crossing for the purpose of securing a better and safer location.

The New York Central has begun the carriage service at the Grand Central Station, New York City, which was announced several weeks ago. The rates are about the same as those which were made by the Pennsylvania when cars were put on at its Twenty-third street station a few months since, though the prices are graded according to arbitrary territorial limits and not by the mile. Aside from the low rates, the most noticeable result of the new service is the abolition of a very noisy crowd of cabmen who formerly stood on the sidewalk in front of the station. This nuisance, it is said, has now been permanently done away with.

#### Railroad Lectures at Yale.

Last week Professor Hadley began a new course of lectures at Yale on Railroad Transportation. We are glad to know that this course is not merely for the edification of the young men who will hear it, but that it is designed to develop and carry forward a set of topics, to be collected later in a new book on railroads, which is in preparation by Professor Hadley.

#### Bids for a Station in Argentine.

Reports state that Minister Buchanan, at Buenos Ayres, has supplied the Department of State with copies of decrees issued by the Argentine government inviting proposals for the building in Buenos Ayres of a central railroad station, to cost not exceeding \$4,000,000, and that the Minister has succeeded in inducing the government, for the first time in the history of such public work, to invite bids from citizens of the United States through the Argentine Legation in Washington.

#### New York State Canals.

On Sept. 30 the State Canal Board passed on plans for the deepening of the Champlain Canal from Whitehall to Fort Edward. Superintendent of Public Works Aldridge has awarded the contract for raising the tow-path of the Oswego Canal, from lock No. 7 to guard lock No. 3, to Edwin Lodder, of Syracuse, at \$48,447. Also the contract for improving the Cayuga and Seneca canal from Geneva harbor to Seneca lake outlet, to Buffalo Dredging Co., of Buffalo, at \$9,900.

#### New Dry Docks Recommended.

Acting Secretary of the Navy Roosevelt has received the report of the board appointed last August to determine the number and situation of new dry docks needed by the navy. This report recommends that a concrete graving dock, 700 ft. long, to cost \$1,300,000, be built at the Boston Navy Yard; at the New York Navy Yard, one concrete graving dock, 500 ft. long, \$1,200,000; at the Norfolk Navy Yard, one concrete graving dock, 500 ft. long, \$1,100,000, and lengthening of the present stone dock to 450 ft., \$250,000; at Newport News, a steel double-sided combined floating and graving dock; at Algiers, La., a double-sided steel floating dock of the combined floating and graving self-docking type, \$750,000; at Mare Island, Cal., a concrete graving dock, 500 ft. long, if the channel be improved, \$1,100,000; at New London, Conn., the construction of canal locks to form a dry dock if a fresh-water basin be built, \$1,000,000; at Tortugas, Fla., a double-sided steel floating and graving dock, \$650,000; at Yerba Buena Island, Cal., in San Francisco Bay, a double-ended dock of concrete, if a survey of the character of the geological formation of the island gives satisfactory results; at San Pedro, Cal., a concrete dock in connection with the proposed harbor improvements. The total sum recommended for these docks is \$11,075,000, of which \$5,775,000 is for five docks urgently needed at New York, Boston, Norfolk, New Orleans and Mare Island.

#### Central Power Station at Washington, D. C., Burned.

On Sept. 29 the central power station of the Capital Traction Co., a six-story brick building occupying an entire block on Pennsylvania avenue, was destroyed by fire. As near as can be ascertained the loss will reach about \$850,000, which was partly covered by insurance. In the lower part of the building were engines and machinery driving the cables of the company. In the upper part of the building the space was taken up by manufacturing companies and offices. Among these was a carriage factory, besides machine shops and tool works. The Southern Railway Co. had several offices, and while its money loss was small it will take considerable time to replace the drawings and records destroyed. For the present the cable may be driven by an electric motor receiving power from the adjoining power station, which is located but about 300 ft. from the destroyed building. Nothing definite has been done as yet regarding the plans for reconstruction, and it is doubtful if arrangements will be made to put in machinery for a cable road. This was one of the most completely equipped cable power stations in the country, but notwithstanding this fact it was proposed to change the motive power in the course of a few years.

#### The Final Development of the Refrigerator Car.

The following story is best told by the documents in the case, the first of which is a press dispatch:

OHIO, Sept. 20.—As a consignment of eggs was being transferred at the Mississippi Valley & Eastern freight house here an employee heard the peep of a chick in one of the crates. Six lively little chicks were discovered and turned over to Agent John Thompson. How the eggs received sufficient heat for hatching is a mystery, as they belonged to a shipment from the West for New York, and were packed in a refrigerator car.

The next document is the report of Mr. Thompson, Freight Agent, to the General Freight Agent of the Mississippi Valley & Eastern Company, as follows:

"In reply to your inquiry of Sept. 21 relative to our checking over seven live chickens (young) in case of eggs

on Van Wert to Piers 28 WB 20, Sept. 17, would say that it is very strange, but nevertheless true.

"The shipment of eggs arrived in M. V. & E. 66,617, one of the new dairy produce refrigerators. The car contained 8,243 eggs for Piers 28, and 900 for Philadelphia. While transferring the 900 for Philadelphia and rearranging the car to enable us to give it a better tonnage one of our truckers heard a chirping and located the right case of eggs, opened it and took from it seven live young chickens. They were somewhat chilled and the cold evidently caused the death of four of them; the other three are alive and active.

"They are done up in woollens and are lying close to kitchen range and I have taken charge of them subject to your orders."

This document is sent up to the General Manager by the Division Superintendent with this endorsement: "This car seems to be more of an incubator than a refrigerator."

The General Manager forwards the correspondence to the proper Vice-President with the endorsement: "This is like finding strawberries in October." The Vice-President, who feels that the subject is not to be treated joculose, endorses: "Or shipping a cow and finding a cow and calf at destination. But if we advertise refrigerators and the public learns that they are incubators they may send butter and eggs by rival routes."

#### The Kansas City Live Stock Exchange.

Judge Foster, of the United States District Court at Topeka, has decided the Kansas City Live Stock Exchange to be a violation of the anti-trust law of 1890, and ordered it dissolved. The Kansas City Star contains an abridgment of the opinion, which is aimed in a certain degree at all exchanges. The Live Stock Exchange operates in the Kansas City Stock Yards, and practically controls the trading in cattle. The rules do not in terms forbid members from dealing with non-members, but they forbid dealing with persons who violate the rules of the Exchange, and these rules are so applied as practically to prevent business between members and non-members. Every outsider who attempts to deal at the stock yards is invited to join the Exchange; if he declines, or if he applies for admission and is refused, his name is posted on the Exchange, and no member can trade with him without violating the rules of the Exchange. Every cattle commission firm at the stock yards is a member of the Exchange, with the single exception of one firm, which was a member and was expelled from the Exchange and is now doing business under injunctions against discriminating against it pending litigation designed to restore the firm to the Exchange.

The Exchange maintains a commission of 50 cents a head on sales, instead of 25 cents, as the commission was before the Exchange was established. In the opinion of Judge Foster the Exchange is subject to the more serious complaint of limiting the number of buyers, and in his judgment it restricts trade and controls the cattle business. It is impossible for an outsider to establish a cattle commission house at Kansas City, and it is impossible for cattle raisers to ship stock to or through Kansas City without paying toll to the Exchange. Being convinced that the cattle business at the Kansas City stock yards is inter-State commerce, Judge Foster reached the conclusion that the Exchange was in restraint of it and therefore a violation of the Sherman anti-trust law.

#### Water Power for Electrical Energy.

Trade and Industry, London, says that a new company has just been formed in St. Petersburg, with a capital of \$2,734,000, to build a plant to utilize the water power of the Buoksa River and Falls in Finland for the generation of electrical energy, and that La Sociedad Electroquímica de Felix is the name of a company which has lately been formed at Barcelona, with a capital of \$240,000, to build and work an electro-chemical factory, and to put down plant to utilize the water power of the Felix Waterfalls.

#### Analyses of Birmingham Steel.

The following analyses of a series of eight heats cast at the new basic open-hearth steel plant of the Birmingham Rolling Mill Company, Birmingham, Ala., may be of interest:

Silicon.	Sulphur.	Phosphorus.	Manganese.	Carbon.
0.005	0.024	0.023	0.40	0.16
trace	0.029	trace	0.41	0.13
0.002	0.038	0.005	0.43	0.14
0.002	0.032	0.007	0.41	0.15
trace	0.031	0.003	0.47	0.16
0.006	0.060	trace	0.45	0.19
0.008	0.026	0.006	0.46	0.20
0.010	0.022	0.008	0.44	0.20

Tests of the steel by bending double cold show an excellent quality of metal.—Iron Age.

#### LOCOMOTIVE BUILDING.

The Wabash has sent out specifications for five passenger and 15 freight locomotives.

The Detroit & Lima Northern has placed an order with the Baldwin Locomotive Works for two 10-wheel freight engines.

The Pittsburgh & Lake Erie Railroad has placed an order with the Pittsburgh Locomotive Works for 10 heavy freight engines.

The Omaha, Kansas City & Eastern is in the market for 10 locomotives. The order will probably be placed by Theodore Gilman, Chairman, 62 Cedar street, New York City.

The Cleveland, Cincinnati, Chicago & St. Louis has finished building a second eight-wheel passenger locomotive at its Brightwood shops. It has cylinders 18 in. x 24 in., boiler 56 in. in diameter with 24 2 in. tubes, driving wheels 68 in., with a wheel base of 23 ft. 5 in. The locomotive weighs in working order 105,000 lbs., with 70,000 lbs. on the drivers.

#### CAR BUILDING.

The Chicago, St. Paul, Minneapolis & Omaha is reported as building 200 freight cars at its Hastings shops.

Bids will be received until Oct. 15 by the Chicago Great Western on 150 box cars of 60,000 lbs. capacity and 36 ft. long.

Swift & Co. have ordered 50 refrigerator cars from the Wells & French Co., Chicago. This order is in addition to the 160 cars recently ordered.

We are officially informed that the St. Louis, Peoria & Northern does not expect to order any new equipment at present. The road was reported as about to increase its order of 330 cars to 530.

In our last issue we stated that the Schoen Mfg. Co. had received an order to build 50 steel cars for the Pittsburgh, Bessemer & Lake Erie Railroad. This should have read the Pittsburgh & Lake Erie road.



The Atchison, Topeka & Santa Fe is considering the building of some refrigerator cars, but the number has not yet been decided upon. The ordering of furniture cars has not been considered yet, as recently reported.

The Receiver of the Louisville, Evansville & St. Louis informs us that no arrangements have yet been made for buying additional equipment. It has been stated that the road would shortly let contracts for 200 freight cars.

The Baltimore & Ohio is having 10 express cars built for the use of the United States Express Co. on Baltimore & Ohio lines. These cars are to be 60 ft. long and fitted with removable stalls for transporting fine horses when not in use in regular service.

The Omaha, Kansas City & Eastern will shortly place orders for 300 coal cars, six chair cars, two first-class coaches, one mail car, two combination cars and two baggage cars through Theodore Gilman, Chairman, 62 Cedar street, New York City.

The Grand Trunk has placed an order with the Michigan-Penninsular Car Co. for 500 box cars of 60,000 lbs. capacity. They will be equipped with M. C. B. couplers and Westinghouse air brakes. The road also intends to build 500 additional box cars of the same capacity and from the same specifications at its own shops.

The Burlington, Cedar Rapids & Northern has received the two locomotives ordered sometime ago from the Brooks Locomotive Works, and the 200 furniture cars ordered from Wells & French are now being delivered. These orders were noted by the *Railroad Gazette* at the time they were given. The report recently published that this road is again in the market for new freight equipment is denied by the President, who writes us that they are now fully supplied in all respects and have all the equipment they expect to purchase for the next two or three years.

The Wabash has placed an order for 250 standard 60,000-lb. box cars with the Missouri Car & Foundry Co., and for 250 with the St. Charles Car Co., the order being divided between the two companies instead of all going to the St. Charles Co., as reported by a contemporary last week. Those being built by the St. Charles Car Co. will be 34 ft. long and equipped with Westinghouse automatic air brakes, Gould couplers, Lawlor safety door, Hutchins roofs and interchangeable brake beams. All castings, including oil boxes, will be of malleable iron. They will be delivered the first part of November. The cars ordered from the Missouri Car & Foundry Co. are to be regular Wabash standard box cars, 34 ft. 7 in. long. These cars will be equipped with the company's standard Diamond trucks, Gould couplers, Westinghouse air brakes and Dunham car doors. The railroad company will furnish the car roofs and brakebeams.

The Barney & Smith Car Co., of Dayton, O., is building for the Union Traction Co., of Anderson, Ind., three 40 ft. inter-urban motor cars with baggage compartment, and three trail cars of the same length, mounted on Barney & Smith Class H truck; also four other cars, 20 ft. long, mounted on Barney & Smith standard Class G truck. These cars are all to be delivered next month.

#### BRIDGE BUILDING.

**Almonte, Ont.**—A new bridge is to be built over the Mississippi at Glen Isle.

**Bolton, Vt.**—The Central Vermont Railroad has awarded the contract for a 61½-ft. plate girder bridge over Stoney Brook to the King Bridge Co., of Cleveland, O.

**Braintree, Vt.**—The Central Vermont has awarded the contract for a 32-ft. plate girder bridge over Speer Brook to the King Bridge Co.

**Lancaster, Pa.**—The County Commissioners have decided to rebuild the bridge over Pequea Creek near Moyer's mill. The new structure will be built of iron, with stone abutments, and will be 120 ft. long. Specifications will be drawn up at once and bids will be advertised for soon.

**Louisiana, Mo.**—The Chicago & Alton has given the contract for the machinery for operating the draw of its new bridge to be built here to the Vulcan Iron Works, Chicago. This makes the seventh bridge across the Mississippi River that this company has furnished machinery for.

**Mountain Home, Idaho.**—Bids are asked until Oct. 15 for a bridge across the South Boise River. W. H. Marmon, County Clerk.

**New York.**—The commissioners of the New East River Bridge have given the contract for the New York anchorage to Shanly & Ryan, 166 West 123d street, New York, at their total bid of \$750,770. The contract for the Brooklyn anchorage has been awarded to the Degnon-McLean Construction Co., 1 Broadway, New York, whose total bid was \$723,578.

**Pottsville, Pa.**—The abutment at the west end of the Washington street bridge gave way on Sept. 29, letting the west span of the structure down on the railroad tracks.

**Roanoke, Va.**—The contract for a bridge at this place has been given to the Virginia Bridge & Iron Co. at its bid of \$1,648.

**Rockford, Ill.**—Bids are asked until Oct. 11 for a plate girder bridge over Keith's Creek at Seminary street. Plans and specifications are on file at the office of Edwin Main, City Engineer.

**Waterford, N. Y.**—The contract for a steel bridge over the side cut of the Champlain Canal at the foot of Fourth street has been given to the Havana Bridge Co. at \$3,507.

**Williamsport, Pa.**—The contracts for the iron work of the bridges to be built over Block House Creek, in Jackson Township, and over Little Pine Creek, in Pine Township, have been given to the Penn Bridge Co., a \$416 and \$629 respectively.

**Yantic, Conn.**—The Central Vermont has awarded the contract for a through lattice bridge of 112-ft. span, to the King Bridge Co.

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Atlantic & North Carolina*, 2 per cent.

*Chartiers*, 5 per cent., payable Oct. 1.

*Cincinnati, Hamilton & Dayton*, quarterly, preferred, 1 per cent., payable Oct. 5.

*Dayton & Michigan*, quarterly, preferred, guaranteed, 2 per cent., payable Oct. 5, and common guaranteed, 1½ per cent., payable Oct. 1.

*Pittsburgh, Fort Wayne & Chicago*, quarterly, special, guaranteed, 1½ per cent., payable Oct. 1, and regular quarterly, guaranteed, 1½ per cent., payable Oct. 5.

*Southwest Pennsylvania*, 5 per cent., payable Oct. 1.

*Western Pennsylvania*, 3 per cent., payable Oct. 15.

*Brockton (Mass.) Street*, quarterly, 1½ per cent., payable Oct. 1.

*Brooklyn City*, quarterly, 2½ per cent., payable Oct. 15.

*Cleveland (O.) City*, quarterly, ¾ per cent., payable Oct. 10.

*Coney Island & Brooklyn*, quarterly, 1½ per cent., payable Oct. 15.

*Louisville (Ky.) Railway*, common 1½ per cent., preferred 2½ per cent., payable Oct. 1.

*National, St. Louis*, quarterly, 1½ per cent., payable Oct. 9.

*North Chicago Street*, quarterly, 3 per cent., payable Oct. 15.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Erie*, annual, for election of directors and other business, New York, Oct. 12.

*New York, New Haven & Hartford*, annual, New Haven, Conn., Oct. 20.

##### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Association of General Baggage Agents* will hold its seventeenth annual convention at Brown's Palace Hotel, Denver, Col., on Oct. 13.

The *American Street Railway Association* will hold its sixteenth annual convention in Convention Hall, Niagara Falls, Oct. 19-22, 1897.

The *Association of Railway Superintendents of Bridges and Buildings* will hold its seventh annual convention at the Brown Palace Hotel, Denver, Col., beginning Oct. 19, 1897.

##### Engineers' Club of Cincinnati.

The regular meeting of the club was held on Sept. 16, at which Mr. A. O. Elzner read a paper on "The Dwelling House from a Sanitary Point of View."

##### American Society of Civil Engineers.

A regular meeting was held at the Society House on Wednesday, Oct. 6. A paper by J. P. Frizell, M. Am. Soc. C. E., entitled "Pressures Resulting from Changes of Velocity of Water in Pipes," was presented for discussion.

##### Western Society of Engineers.

The Western Society of Engineers held a regular meeting in the society rooms, Monadnock Block, Chicago, Wednesday evening, Oct. 6. The evening was spent in discussing the recent excursion of the Society through the East. A full account of this trip was published in the *Railroad Gazette* of Oct. 1.

##### St. Louis Railway Club.

The next regular meeting of the St. Louis Railway Club will be held in the parlors of the Southern Hotel, on Oct. 8, at 3 p. m. There will be a discussion on the paper presented at the September meeting by Mr. J. A. Gohen, Master Car Painter C. C. & St. L., entitled "Care of Passenger Equipment at Terminals."

A paper will also be presented by Jno. S. Thurman, Mech. Eng. Missouri Pacific, entitled "Advancement of American Railways and What we may Expect in the Future." This paper will be illustrated.

An adjourned meeting of the club will be held in the Music Hall of the St. Louis Exposition Building, Friday evening, Oct. 8, at 8:30 o'clock, at which an address will be delivered by Capt. W. W. Peabody, Vice-President and General Manager of the Baltimore & Ohio Southwestern.

##### Central Railway Club.

A meeting of this Club was held at the Hotel Iroquois, Buffalo, N. Y., on Sept. 10. The meeting was called to order by the Vice-President, John S. Lentz, with 27 members present. Two new members were announced, Mr. Howard G. Brown and Mr. Philip Gerst. After the reports of standing committees and some matters of business had been disposed of, a special committee, consisting of Messrs. E. A. Miller, Eugene Chamberlin and Fred B. Griffith, submitted a memorial to the late W. H. Gurney. A communication from Mr. Hewitt, Chairman of the Committee on "Steel Shapes for Trucks," was read. A motion was presented that the Committee on Steel Shapes for Trucks be discharged, but the whole matter was finally laid on the table.

Mr. H. F. Ball then read a paper on "Journal Bearing Keys." This was a report of a committee of which Mr. Ball is the sole member. The report was received and laid over until the next meeting for discussion. This paper was followed by one on "The Use of Malleable Iron in Car Construction and Repairs," by Mr. Eugene Chamberlin. This paper was received and filed and the committee discharged.

The subject for discussion was "Brick Arches in Locomotive Fire Boxes," but as none of the committee was present the discussion was closed.

The next regular meeting of the Club will be held at the Hotel Iroquois on Friday, Nov. 12. It will be preceded by a meeting of the Auditing Committee and the Executive Committee.

A committee consisting of Messrs. James Macbeth, Chairman, J. R. Petrie and the Secretary was appointed to arrange for an excursion to Niagara Falls and a visit to the power plant of that place, and possibly a trip over the Gorge Road, for the November meeting. The hour named for leaving Buffalo is 9 o'clock on the morning of Nov. 12.

The docket for the November meeting contains a report on "Springs for Freight Car Trucks," by Messrs. H. C. McCarty, H. F. Ball and J. R. Petrie. Committee. Also a discussion of "Journal Bearing Keys; Their Proper Relation to the Journal Bearing and Box." Also a topical question by Mr. S. Higgins: "How Are We to Use the Measurement 4 ft. 6½ in." as noted on page 10 of the M. C. B. Code that went into effect Sept. 1.

#### PERSONAL.

—Mr. Lyman E. Cooley has resigned as Consulting Engineer of the Board of Trustees of the Chicago Drainage Canal.

—Mr. W. A. Love has resigned as Trainmaster and Master Mechanic of the Chattanooga, Rome & Columbus, at Rome, Ga.

—Mr. J. A. Wilson has resigned as Traveling Freight Agent of the Wisconsin Central, with headquarters at Cincinnati, O.

—Mr. William E. Clark has resigned as Roadmaster at Charlestown, N. H., of the Vermont Valley, a branch of the Boston & Maine.

—Mr. Harry Fox, Superintendent of the Iowa Division, Main Line, of the Chicago, Rock Island & Pacific, has resigned to enter other business.

—Mr. H. A. Fritz has resigned as Mechanical Engineer of the Illinois Central to accept a position with the Universal Car Bearing Co., of Chicago.

—Mr. W. H. B. Rosing, Master Mechanic of the Denver & Rio Grande has resigned to return to his former position of Mechanical Engineer of the Illinois Central.

—Major S. K. Hooker, General Passenger Agent of the Denver & Rio Grande, has been appointed by Governor Adams, of Colorado, a member of the Omaha Exposition Committee.

—Mr. W. A. Stearns, who for many years was engaged in railroad building in Canada, Illinois and Michigan, died at his home in Birmingham, Mich., Sept. 26, at 67 years of age.

—Mr. Allen Sheldon, formerly Chief Clerk of the Burlington Division Freight Agent's office of the Chicago, Burlington & Quincy, at St. Joseph, Mo., died Sept. 27 at his home in Nebraska City, Neb.

—Mr. John Hobson, who for some time past has been Assistant Signal Engineer for the Michigan Central, has recently been appointed Signal Engineer for the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan.

—Mr. John B. Garrett, Third Vice-President of the Lehigh Valley, has resigned from the Board of Managers of the Joint Traffic Association, the reason given being that Mr. Charles Hartshorn, First Vice-President, is going on a four months' trip to Japan.

—Mr. H. A. Fritz, Mechanical Engineer of the Illinois Central, resigned Sept. 1 to accept the position of Mechanical Superintendent of the Universal Car Bearing Co., with an office at 1430 Old Colony Building, Chicago. The same company has offices in New York and St. Louis.

—Mr. S. Hasegawa, Mechanical Engineer of the Nippon Railway of Japan, sailed for England on the St. Paul Oct. 6. He will spend about a month in England, and go from there to France, Germany and Italy to look into the railroad systems of those countries, and will probably continue east to Japan, reaching home about the middle of February. Mr. Hasegawa left Japan April 16 and came direct to this country via Vancouver. He has visited many of the makers of railroad materials, and on his recommendations will depend the ordering of a large amount of equipment and machinery for his road.

#### ELECTIONS AND APPOINTMENTS.

**Atchison, Topeka & Santa Fe.**—B. J. Libbe, heretofore Traveling Commercial Freight Agent of the Iowa Central, at Peoria, Ill., has been appointed Chief Clerk to the General Freight Agent of the Atchison, Topeka & Santa Fe, at Chicago.

**Baltimore & Ohio Southwestern.**—O. P. McCarty has been appointed General Passenger Agent, to succeed J. M. Chesborough. George F. Randolph having been appointed to represent this road, the Baltimore & Ohio and the Pittsburgh & Western on the Board of Managers of the Joint Traffic Association, the office of General Traffic Manager of this company is abolished, and the General Freight Agent and General Passenger Agent will hereafter report direct to the Vice-President and General Manager. Because of this change the following appointments have been made: W. W. Peabody, Jr., heretofore Coal Traffic Manager, is appointed Assistant General Freight Agent, to succeed C. H. Goodrich, recently resigned. J. R. Clark having resigned as General Freight Agent, with headquarters at Louisville, Ky., Edward Hart, Jr., at present Assistant General Agent, will assume his duties. E. P. Rubrah, Division Freight Agent of the Ohio Division, with headquarters at Chillicothe, O., has been made Traveling Freight Agent of the Ohio Division. N. G. Spangler, Division Freight Agent of the Western Division, with headquarters at Vincennes, Ind., has been made Traveling Freight Agent of the Mississippi Division main line and branches, except the Springfield Division. H. B. Goddard, Division Freight Agent Cincinnati Division of the Louisville Branch, with headquarters at Seymour, Ind., W. O. Paxton, Commercial Agent, with headquarters at Cincinnati, O., and J. F. Ely, Live Stock Agent, with headquarters at Stock Yards, Cincinnati, O., have had their offices abolished. It is announced that the office of the Assistant General Passenger Agent will be returned to St. Louis and that George Warfield, now Assistant General Passenger Agent, at Cincinnati, will take charge of the office.

**Central Pacific.**—On account of absence in Europe, causing a lack of quorum in the Board of Directors, C. P. Huntington and Isaac T. Gates have temporarily resigned as directors and substitutes have been appointed. It is stated that Mr. Huntington and Mr. Gates will be placed again on the Board at the next annual meeting.

**Chicago, Rock Island & Pacific.**—W. M. Hobbs, heretofore Division Superintendent at Horton, Kan., has been appointed Superintendent of the Iowa Division, with headquarters at Des Moines, Ia., to succeed Harry Fox, resigned. Charles Jones, heretofore Trainmaster of the Iowa Division, has been assigned to the superintendency at Horton. His place is to be filled by A. F. Abbott, with headquarters at Harrington, Kan.

**Columbus, Sandusky & Hocking.**—A. M. Salisbury, for several years Supervisor of the Philadelphia & Reading, has been appointed Supervisor of this road, with headquarters at Marion, O. He will have charge of the tracks between Alum Creek and Sandusky, O. W. A. Frank, with headquarters at Fultonham, O., has been made Supervisor of the Southern Division.

**Cumberland Valley.**—At the annual meeting of the stockholders, held in Harrisburg, Oct. 4, Frank Thomson, President of the Pennsylvania, was elected a Director to succeed H. H. Houston, and Samuel Rea, of Philadelphia, to succeed George B. Roberts, both deceased.

**Eastern Minnesota.**—G. T. Slade, for some time Acting Superintendent, has been made Superintendent.

**Fitchburg.**—At the annual meeting of stockholders, held at Boston, Sept. 29, Brigham M. Bullock and Charles S. Lowell were elected directors to fill vacancies. In addition David P. Kimball, Charles T. Plunkett and James Renfrew, three State Directors, were elected, making a



total of 15. It is understood that Mr. Bullock will be succeeded as director by the new President when he shall have been elected.

**Fort Worth & Rio Grande.**—C. H. Stevens, Chief Dispatcher, has been appointed Superintendent of Transportation, to have charge of stations, train service and telegraph, with office at Fort Worth.

**Grand Trunk.**—W. Aird has been appointed Master Mechanic instead of Acting Master Mechanic in charge of the Montreal shops.

**Greenfield & Maxwell.**—At a meeting of the stockholders of this new company (referred to in another column), held in Greenfield, Ind., Sept. 23, the following Board of Directors was elected: W. A. Alford, Anderson, Ind.; J. H. Moulden, Samuel R. Wells, Eph Marsh, Hollis B. Thayer, Jerome Black and George H. Cooper, Greenfield, Ind. At a subsequent meeting of the Board of Directors the following officers were elected: President, S. R. Wells; Vice President, H. B. Thayer; Secretary, J. H. Moulden; Treasurer, George H. Cooper.

**International & Great Northern.**—George L. Filer has been appointed Commercial Agent, with headquarters at San Antonio, Tex.

**Leavenworth Kansas & Western.**—W. E. Reid, Bookkeeper in the office of the Auditor of the Union Pacific, has been appointed Auditor and Assistant Treasurer of the Leavenworth, Kansas City & Western, with headquarters at Leavenworth, Kan.

**Mexican National.**—L. M. Lamar has been appointed Assistant General Freight Agent. H. T. Green, formerly Chief Clerk of the General Passenger Department, has been appointed General Passenger Agent, to succeed W. B. Ryan. The headquarters of both officers are at Mexico City.

**New York Central & Hudson River.**—William H. Van Wie has been appointed Acting Assistant General Roadmaster in charge of the Mohawk Division, with headquarters at Albany, N. Y., to succeed George B. Overbaugh, deceased.

**New York, Ontario & Western.**—At the annual meeting of stockholders held in New York, Sept. 20, the old Board of Directors was re-elected with the exception of E. B. Sturges, of Scranton, Pa., who is succeeded by O. D. Ashley, President of the Wabash.

**Northern Central.**—At a recent meeting of the directors M. H. Arnot, of Elmira, and Wayne MacVeagh and Michael Jenkins, of Baltimore, were elected Directors to fill the vacancies caused by death.

**Northern Pacific.**—At the annual meeting of the stockholders held in New York Oct. 5, Daniel S. Lamont, Charles Mellen, John G. Moore and Oliver H. Payne were chosen new directors for the ensuing year.

**Oregon & California.**—At a special meeting of the directors of this leased line of the Southern Pacific, held at Portland, Ore., Sept. 27, W. A. Grondahl, Portland, Ore., and William D. Fenton were elected directors to succeed Donald Macleary and Col. Charles F. Crocker, deceased.

**Oregon Railroad & Navigation Co.**—J. G. Woodworth, heretofore Assistant to the President, has been made General Freight Agent, with headquarters at Portland, Ore. His assistant is R. B. Miller.

**Pittsburgh & Lake Erie.**—S. R. Galloway, President of the Lake Shore & Michigan Southern, has been elected President of this road.

**Pittsburgh, Wheeling & Kentucky.**—At a meeting of the Board of Directors, held at Pittsburgh, Oct. 25, Second Vice-President J. T. Brooks, of the Pennsylvania, which leases this line, was made a Director, to succeed John E. Davidson, deceased.

**Santa Fe, Prescott & Phoenix.**—A. S. Greig, Chief Clerk to the General Superintendent of the Denver & Rio Grande, has been appointed Traimaster of the Santa Fe, Prescott & Phoenix, with headquarters at Prescott, Ariz.

**Southern.**—J. B. Gannon has been appointed Master Mechanic, with headquarters at Louisville, Ky., to succeed V. B. Lang, resigned. J. T. Robinson has been appointed Master Mechanic of the Anniston Division, at Selma, Ala., to succeed T. M. Feeley, who has been transferred to Birmingham, Ala., as Master Mechanic of the Birmingham Division, to succeed W. A. Stone, resigned.

**Plant System.**—W. V. Lifsey, Division Passenger Agent, at Montgomery, Ala., has been transferred to Tampa, Fla. F. M. Jolly, Division Passenger Agent, at Tampa, Fla., has been transferred to Jacksonville, Fla., and R. L. Todd, Division Passenger Agent, at Jacksonville, to Montgomery.

**Toledo, St. Louis & Kansas City.**—F. M. Dowler, General Agent, has had his jurisdiction extended over the territory covered by F. L. Bassett, who has resigned his position as New England Agent at Boston. Mr. Dowler's address is 353 Broadway, New York City.

**Vandalia.**—J. B. Modisette, Chief Clerk to the Assistant General Passenger Agent, at Chicago, has been made Chief Clerk of the General Passenger Department at St. Louis, Mo., to succeed George R. Chesbrough.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Atlantic Coast Line.**—A link is being built connecting the Wilmington & Weldon and Wilmington & Newbern, two roads that form a part of the Atlantic Coast Line system. The line skirts the city of Wilmington, N. C., and is 27 miles long. The grading is very light, and it is expected that the line will be completed and in operation by the middle of October. J. T. Kenly, Wilmington, N. C., is General Manager of the Atlantic Coast Line.

**Baltimore & Ohio.**—It is reported that the engineers are surveying an extension from Smithfield, Pa., by way of Pleasant Hill and York's Run to Moser Farm, about three miles, and that other engineers are running a line from Point Marion down the Monongahela River, about six miles, to Cat's Run.

**Canadian Roads.**—Lount, March & Cameron, Toronto, Ont., are seeking the incorporation of a company to build a line from a point near the head of Chillcat Inlet, on the Lynn Canal, Alaska, to the Rink Rapids, on the Yukon River, with power to build bridges, wharves, telegraph, telephone lines, etc.

**Centralia & Chester.**—About 180 men are at work on this new line and the bridges are nearly completed. The

road is to extend from Evansville, Ill., through Ellis Grove to Chester, about 18 miles, and the grading for the whole distance has been completed for some time. C. M. Forman, Springfield, Ill., is Receiver.

**Chesapeake Beach.**—The Chesapeake Bay Construction Co., Fifteenth and H streets, N. E., Washington, D. C., has been given the contract to build and equip this road. (See this column for Sept. 17 under Washington & Chesapeake Bay Construction Co.) The work will be let to sub-contractors direct. Some sidings and yards may be laid with good relaying rails. The engineers are now staking out the work and it is intended to begin grading soon. L. H. Hyer, Washington, D. C., is Chief Engineer of the Chesapeake Bay Construction Co.

**Cohulla & Zacatecas.**—Track-laying has begun on this Mexican road and grading on the same line has been extended as far as kilometer 60, while the preliminary work has gone as far as kilometer 90. This road as projected is to run from Saltillo, state of Coahuila, southwest to Concepcion Deloro, state of Zacatecas, about 80 miles. According to the concession 30 km. (18.6 miles) must be completed before June 12, 1898.

**Cumberland Mountain.**—This company has been incorporated in Tennessee, with a capital stock of \$20,000 per mile, to build a line from the Cincinnati Southern at some point between Lansing Station, Tenn., and the Kentucky state line to a point on the Nashville & Knoxville or Tennessee Central in Fentress or Putnam County, and with a branch from a point in Fentress County north to the Kentucky state line. The incorporators are: Bruno Gernt, A. C. Fry, P. L. Phillips, W. L. Phillips and Max Golditz.

**Deckerville, Osceola & Northern.**—This company was incorporated in Arkansas Sept. 29 with a capital of \$350,000, to build a line from Deckerville, in Poinsett County, Ark., a point on the Kansas City, Fort Scott & Memphis northeast about 50 miles to Blythesville. The incorporators are George W. Decker, E. N. Ford, J. B. Webb, J. M. Ward and C. H. Trimble.

**Edmonton, Peace River & Yukon.**—This company is seeking incorporation to build a road from Edmonton, Alberta, to a point on the navigable waters of the Yukon. Code & Burritt, Ottawa, are agents for the company.

**Fonda, Johnstown & Gloversville.**—This company has laid 13 miles of 70-lb. rails between Broadalbin Junction and Northville, N. Y., completing the equipment of the entire line with heavy rails. Three new steel bridges between Gloversville and Northville are being built under the direction of Mr. C. F. Stowell, of Albany, N. Y. The company is also making extensive improvements at Sacandaga Park, at the northern terminus of the road, which will add materially to the attractions at the park, and is about to order some new coaches. This line runs from Fonda, a point on the New York Central & Hudson River, northeast through Fulton County 26.2 miles to Northville, with a branch of 6.2 miles from Broadalbin Junction to Broadalbin, N. Y. J. Ledlie Hees, Gloversville, N. Y., is President.

**Great Northern.**—This company is making considerable improvements at St. Anthony Park, Minneapolis, having purchased about 40 acres of land there for new freight yards. The work will require about 20,000 yds. of filling and six to eight miles of new track. John F. Stevens, Minneapolis, is Chief Engineer.

**Greenfield & Maxwell.**—This company has been incorporated in Indiana to build a line in Hancock County from Greenfield, Ind., north about six miles to Maxwell. The names of directors and officers will be found in another column.

**Greenville & Pearl Creek.**—This company was incorporated in New York Oct. 1 with a capital of \$100,000 to build a railroad from Greenville in Livingston County, northwest about eight miles to Pearl Creek. The directors are: Edward L. Fuller, Henry H. Sively, of Scranton; Milo L. Belding, Milo L. Belding, Jr., and William B. Putney, New York City; Charles G. Yates, David Hyman, Rochester, N. Y.; Henry D. Fuller, Bayonne, N. J., and Joseph N. Smith, Lynn, Mass.

**Helena & Missouri River.**—This company was incorporated in Montana Sept. 22 with a capital stock of \$100,000 to build a line from Helena, Mont., east about 30 miles to Canon Ferry. The incorporators are Richard A. Harlow, William J. Fuchs, Albert L. Smith, John B. Clayberg and M. S. Gunn, of Helena.

**Irontale, Bancroft & Ottawa.**—By an arrangement of President C. J. Pusey, of Irontale, Ont., this road is to build an additional five miles of line this fall.

**Kansas City & Northern Connecting.**—The portion of this line between Kansas City and Smithville has been completed and trains began running from Kansas City Sept. 26. The road as projected is to connect the Kansas City, Pittsburgh & Gulf at Kansas City with the Quincy, Omaha & Kansas City at Pattonburg, 52½ miles. Of this line 22 miles to Smithville have been completed and work is being rapidly pushed on the remaining portion. A. E. Stilwell, Kansas City, Mo., is President and Theodore C. Sherwood, General Manager.

**Mesa, Florence & Globe.**—This company has been incorporated in Arizona to build a line from Mesa, Ariz., east about 60 miles by way of Florence to Globe. C. C. McNeill is President, and F. B. Sanford Secretary, both of Phoenix, Ariz.

**Mexican Roads.**—Connecticut capitalists are reported to have obtained from the Mexican government a concession to cut logwood from land bordering on the north bank of Hondo River, which forms the boundary between Mexico and British Honduras. The company is to build a railroad from the swamps to the river.

**Mexican Southeastern.**—Grading of 50 kilometers (31 miles) of this Mexican road have been completed from San Geromino through Juchitan. The road as projected is to run from San Geromino southwest along the Pacific coast about 420 km. (261 miles), with a branch of 200 km. running north from Tonalá to Tuxla Gutierrez.

**Mexico, Cuernavaca & Pacific.**—According to G. A. Stranahan, Construction Engineer, work on this Mexican road is making such progress that it will be completed by the middle of October into Cuernavaca. Work is being carried on between Tres Marias and Cuernavaca, about 40 km. (25 miles). All of this distance is nearly graded and requires in some places only the laying of the rails. Work is also being carried on from Cuernavaca south, although very little has as yet been done at that point. From there to Puente de Ixtla is about 58 km. Gangs are busy working both north and south of Ixtla. Of the northern part some eight kilometers have already been completed, while over 40 have been finished to the south. For some time past a gang of men has also been at work within the Cañon de la Mano. The length of this cañon is about five kilometers,

and this is very nearly done. Beyond the cañon there are also four kilometers that are graded ready for the rails. When the construction work is done as far as Iguala, which, as has been said, is expected to be completed within six months, there will still remain the distance from Iguala to Chilpancingo, 60 miles, and from Chilpancingo to the coast, a distance of 200 miles.

**Nashville & Knoxville.**—It is reported that a survey was begun Sept. 29 for an extension of this road from Lebanon west about 30 miles to Nashville, Tenn. R. J. Moscrip, Cookeville, Tenn., is engineer in charge. The line will run between the Nashville, Chattanooga & St. Louis and the Cumberland River.

**New Roads.**—Eugene V. Debs, head of the Social Democracy of America, is seeking the privilege of building a railroad in Tennessee from Nashville to Lebanon, 75 miles. It is proposed to employ idle labor under the direction of the Social Democracy and to turn the line over when completed to the City of Nashville.

**New York & Ottawa.**—Work is being rapidly pushed forward on both sides of the St. Lawrence. In organizing this road it was necessary to incorporate three distinct companies, the New York & Ottawa (New York State corporation) the New York & Ottawa (Canadian corporation) and the Cornwall Bridge Co. Consolidation is proposed in due time and an issue of first mortgage 4 per cent. gold bonds limited to \$15,000 per mile to be made upon the entire line. The lien will be a collateral one upon the bridge and Canadian railroad properties. Second mortgage income bonds at the rate of \$5,000 per mile have been authorized and \$20,000 per mile of stock, including the Northern New York, which the company has purchased, the line will extend from Tupper Lake, N. Y., to Moira, 56.1 miles, from Moira to the International line on the St. Lawrence bridge, 15.4 miles, and from the International line to Ottawa, 58.7 miles, a total of 130.2 miles.

The Canadian line extending from the International Boundary in the south channel of the St. Lawrence River near Cornwall, to Rideau River bridge at Ottawa, has the following characteristics:

Maximum grades, 39.6 ft. per mile with compensated curves; aggregate length of grades, 41.22 miles or 72.3 per cent.; maximum curvature, two degrees, except one curve of three degrees and one of 2½ degrees in the approaches of the St. Lawrence River bridge; aggregate length of curvature, 12.42 miles or 21.8 per cent. There are 17 wood trestles with an aggregate length of 1,380 ft. The aggregate length of metal bridging is 1,780 ft., and of steel trestle 280 ft.

That portion of the line between International Boundary in the south channel of St. Lawrence River and Moira, N. Y., will have maximum grades, 39.6 ft. per mile with compensated curves; aggregate length of grades, 10.65 miles or 69.1 per cent.; maximum curvatures, two degrees, except one 4 degree curve connecting with Northern N. Y. R. R. at Moira; aggregate length of curvature, 4.27 miles or 2.76 per cent.; number of wood trestles, seven, with aggregate length of 585 ft., and the aggregate length of metal bridging is 1,342 ft.

**New York, Susquehanna & Western.**—The new road known as the Susquehanna Connecting, an extension of the Wilkes-Barre & Eastern Division of the New York, Susquehanna & Western, has been completed and was opened for traffic Oct. 1.

**Oak Hill & Moosic.**—This company was incorporated in Pennsylvania Oct. 5 for 100 years with a capital stock of \$2,000 to build one mile of line from a connection with the Delaware & Hudson at Moosic to the Erie & Wyoming Valley at Oak Hill. The directors are: D. K. Oakley, President; J. L. Rea, F. S. Pauli, R. Ireland and J. W. Browning, all of Scranton, Pa.

**Pacific Coast Railway.**—This company has completed a spur 3.7 miles long to Bishop's Peak, Cal., branching from the main line about half a mile north of San Luis Obispo. No engineering difficulties were presented, little grading being necessary, and the curves few and light. The work was done by the company and was to be completed Oct. 1. E. W. Clark, San Luis Obispo, Cal., is Superintendent.

**Pennsylvania Co.**—This company is reported to have made another contract for 1,500 tons of rails to be used in building about four miles of track on the Northern Central Division from a point near New Cumberland, Pa., south.

**Penn Yan & Pennsylvania.**—This company, whose organization was noted in this column Sept. 24, has been incorporated in New York with a capital of \$400,000 to build a line from Penn Yan, N. Y., southwest 35 miles to a point near Savona, connecting with the Rochester division of the Erie and the Buffalo division of the Delaware, Lackawanna & Western. The Board of Directors is as follows: George F. Andrews, Owego, N. Y.; James Roberts, Archibald Roberts, Charles A. Cockroft, Clement C. Covert, Charles B. Brown, Binghamton, N. Y.; James D. Nares, Corning; Joseph Crosby, Crosby, N. Y.; Ira G. Gibson, Gibson, N. Y.; John C. Zimmerman, Frank Plaisted, Benjamin Hedges and J. M. Peck, Bradford, N. Y.; James M. Washburn, Daniel E. Hoover, of Keuka, N. Y. The main office is at Binghamton.

**Prescott & Eastern.**—This company has been incorporated in Arizona to build a line from a point five miles north of Prescott on the Santa Fe, Prescott & Phoenix, southeast about 30 miles to Mayer and the O'Neill onyx quarries. The incorporators are: D. M. Ferry, C. C. Bowen, Simon J. Murphy, Detroit, Mich.; N. K. Fairbank, Jay Morton, G. W. Kretzinger, Chicago; and F. M. Murphy, Prescott, Ariz. All of these men are directors or officers of the Santa Fe, Prescott & Phoenix.

**Richmond, Petersburg & Carolina.**—Work has been resumed on the building of this road which was interrupted by an injunction brought against the company by the Old Dominion & Carolina, which claims to have the prior right of way, but the injunction has been dissolved. This road is projected to run from Ridgway, N. C., north about 100 miles to Richmond. De Witt Smith, of New York City, is President.

**Saluda Southern.**—This company has been incorporated in Arizona to build a line from Yuma, Ariz., northwest to Flagstaff, 353 miles, with branches to Parker, 140 miles; to Tempe, 20 miles; to Nogales, 193 miles, and a belt line through the Salt River Valley. The total length of the proposed system is 878 miles. The incorporation is made by members of the Rio Verde Vanal Co., of which Prosper P. Parker is President and Frank L. Conkey Secretary.

**Sedalia, Marshall & Northern.**—The final survey of this road was completed Sept. 24, and it is stated that work will begin soon. The road as projected will extend from Sedalia, Mo., north about 45 miles to Miami.

**Springfield, Ohio River & South Atlantic.**—The directors of this company, whose incorporation was noted



In this column last week, met at Vincennes, Ind., Oct. 1, and decided to put engineers at work making a location survey on Oct. 11. E. E. Watts, of Princeton, Ind., was appointed Chief Engineer. This road is projected to run from Vincennes east across the southern end of Indiana to connect with the Black Diamond system, which is being promoted by Albert E. Boone, of Zanesville, O.

**Wabash.**—It is reported that this company has decided to replace 63-lb rails with 80-lb. rails for 60 miles west of Andrews, Ind., and that 50 men are now at work.

**Washington, Westminster & Gettysburg.**—This company is being organized to build a line from Washington, D. C., north through Westminster, Md., and Littlestown, Pa., to Gettysburg. Among the incorporators are: E. J. Sawyer, William B. Thomas, of Westminster; T. Herbert Shriver, Union Mills, Md.; John A. Shorb, Littlestown, Pa.; Dr. Colgrove and H. A. Cady, Washington, D. C. It is stated that the Philadelphia & Reading is interested in the new line.

#### Electric Railroad Construction.

**Baltimore, Md.**—The Baltimore & Northern Electric Railway Co. will soon complete its line to Pikesville, passing through Mt. Washington, and referred to in our issue of Sept. 17. J. G. White & Co. have the contract for building the line and will soon have the main portion completed. The company has received 14 new open cars and eight closed cars. The open cars are 30 ft. 6 in. over all, with center aisles and rattan seats. Each will be supplied with two 30 H. P. Westinghouse motors. It is stated that seven large double-truck closed cars have also been ordered. A traffic agreement has been made with different companies, so that connections can be made with the cars running to all parts of the city.

**Brooklyn, N. Y.**—Plans are being completed for a new electric line from Flatbush to Bath Beach and Bensonhurst. The Avenue C portion of the work may be completed this fall, but the remainder of the line will not be built until next year.

**Buffalo, N. Y.**—The tracks of the Buffalo, Kenmore & Tonawanda Electric Railroad will be extended eastward to connect with the Main street line this fall. It appears that the stockholders of this road are largely interested in the Buffalo Traction Company, which will enable the two to make traffic arrangements to the benefit of both. It is stated that the contract for the construction of this line will be given to the Erie Construction Co. It will be necessary to build a spur under the Erie Railroad tracks at Delaware avenue. Private right of way will be secured for a part of the distance.

**Coxsackie, N. Y.**—The Railroad Commissioners on Oct. 1 granted the applications of the following companies for permission to construct electric roads: Coxsackie & Greenville Traction Co., Windham Traction Co., Oakhill Traction Co. and Middleburg & Oakhill Traction Co. These roads, with the Greene County Traction Co., will form a through line of electric railroads from Coxsackie to the village of Middleburg, Schoharie County.

**Cripple Creek, Col.**—Contract for building a standard gage railroad from Canon City to Cripple Creek has been let by the Canon City & Cripple Creek Electric Railway Co. to Orman & Crook, of Pueblo. The road, as at present planned, is to be 30 miles in length, and must be ready for use March 20, 1898.

**Doylestown, Pa.**—Work has been commenced on the new electric line which the Bucks County Railway Co. is laying from Willow Grove to Doylestown. It is located on the turnpike between the two places, and passes through several towns. Its completion and operation are promised within 90 days.

**Fulton, N. Y.**—The work on the Second Avenue tracks for the electric road is being pushed rapidly and the street has been cut down to grade where necessary.

**Gettysburg, Pa.**—An agreement has been entered into between capitalists interested in the proposed electric line between Gettysburg and Washington, D. C., for building the line. The proposed route is from Rockville, Md., through Westminster, Union Mills and Littlestown to Gettysburg, and it is stated that arrangements have already been made for building the road. Construction work must be begun 60 days after the contract is let, and finished one year from date of agreement. Under the articles of agreement a New York syndicate is to build the road, and further provides for heavy, first-class material throughout.

**Greenbush, N. Y.**—A corps of engineers under Mr. C. H. Hollingsworth are going over the old location for the electric line of the Greenbush & Nassau Railroad from Rensselaer, N. Y., to Brainard station, N. Y. Work was commenced on the grading Oct. 1, and the entire length, 18 miles, is now under contract or will be let shortly.

**Greenville, N. Y.**—The Greigsville & Pearl Creek Railroad Co. was incorporated Oct. 1, with a capital of \$100,000, to construct a standard gage steam road, 10 miles long, from Greigsville, Livingston County, to Pearl Creek, Wyoming County. The directors are M. M. Belding, M. M. Belding, Jr., of 455 Broadway, and William B. Putney, of 115 Broadway, New York; Arthur G. Yates and David Hyman, of Rochester, N. Y.; H. D. Fuller, of Bayonne, N. J.; H. H. Sively and E. L. Fuller, of Scranton, Pa., and J. N. Smith, of Lynn, Mass.

**Merion, Pa.**—The Philadelphia & Merion electric railroad company has obtained permission to build its road to the Belmont Driving Park near Narberth. It is said that the road will be built this winter and finished by Feb. 1.

**San Antonio, Tex.**—The Texas Transportation Co., of San Antonio, has been granted a charter with a capital stock of \$25,000 to build a street railroad for the transportation of freight. The incorporators are Otto Koehler, O. W. Wurmund and O. Bergstrom.

**Sunbury, Pa.**—The Sunbury & Northumberland Street Railway Co. will extend its line next summer and add several cars to its rolling stock.

**Tiffin, O.**—Samuel B. Smith, President of the Commercial Bank of this city, and eastern capitalists have completed arrangements for the Tiffin & Fostoria electric railroad. It is said that work will commence on the extension at once.

**Vanderbilt, Pa.**—At a recent meeting of the Board of Directors of the Connellyville, Leisenring & New Haven street railroad, it was decided to extend the line from Leisenring to Vanderbilt. Work will be begun at once, and it is expected that the cars will be running within a month.

**Washington, D. C.**—The new electric line of the Baltimore & Washington Transit Co., from a junction of the Brightwood Electric Railway in the District of Co-

lumbia to Sligo Creek, in Montgomery County, is completed, and the cars are running. By a traffic agreement with the Brightwood company the cars of the new line reach the city of Washington by way of Seventh street, where transfers are given to city lines, and the passengers conveyed to all parts of the city. The new line will be used for both passenger and freight business.

#### GENERAL RAILROAD NEWS

**Blue Ridge & Atlantic.**—For the second time Judge Newman, at Atlanta, Ga., Sept. 27, ordered this road sold. It was offered for sale Aug. 7 (see this column for Aug. 20), the upset price being \$75,000. But as the highest bid was only \$40,000, Judge Newman refused to confirm the sale. No upset price is named for this sale, but the successful bidder must deposit \$2,500 as evidence of good faith. The road extends from Cornelia to Fullulah Falls, Ga., 21 miles. W. V. Lauraine is Receiver.

**Canada Atlantic.**—A change has been announced in the eastern terminus to Swanton, Vt. Trains now run to Rouse's Point, N. Y., over the tracks of the Grand Trunk from Lacolle, Que. Under the new arrangement Swanton will be reached from Rouse's Point over the tracks of the Central Vermont. The company is extending its line into Vermont by way of a new bridge over the Richelieu River to Lacolle (see this column for June 11). The western terminal is Parry Sound, Ont. It is stated that the company will run a line of steamers from there to Chicago. At Swanton, where connection is made with the Central Vermont and the Boston & Maine, work is said to have been begun on the terminal yard and shops. E. J. Chamberlin, Ottawa, Ont., is General Manager and George A. Mountain Chief Engineer.

**Canadian Pacific.**—The earnings for August and for the eight months ended Aug. 31 were reported as follows:

August:	1897.	1896.	Inc. or Dec.
Gross earn.	\$2,232,115	\$1,837,485	I. \$394,630
Oper. expen.	1,227,708	1,072,624	I. 155,084
Net earn.	\$1,004,407	\$814,861	I. \$189,546
Eight months:			
Gross earn.	\$14,051,811	\$12,842,712	I. \$1,209,099
Oper. expen.	8,465,852	8,219,679	I. 246,173
Net earn.	\$5,585,959	\$4,623,033	I. \$962,926

**Chesapeake & Ohio.**—The earnings for August and for the two months ended Aug. 31 were reported as follows:

August:	1897.	1896.	Inc. or Dec.
Gross earn.	\$1,006,408	\$862,258	I. \$144,150
Oper. expen.	660,168	559,074	I. 101,094
Net earn.	\$346,240	\$303,184	I. \$43,056
Two months:			
Gross earn.	\$1,961,108	\$1,702,311	I. \$258,797
Oper. expen.	1,281,475	1,107,596	I. 173,879
Net earn.	\$679,633	\$594,715	I. \$84,918

**Chicago & Southeastern (Ind.).**—The Supreme Court at Indianapolis, Ind., has affirmed the case of this company against Robert McBeth in which the lower court appointed a receiver for the railroad company on the application of numerous creditors. The creditors claim that all the earnings of the road are being used to pay the salaries of officials, but that no effort is being made to pay the company's debts. It is understood that the Chicago, Indianapolis & Louisville will acquire this road, and that options have been taken on land in Anderson, Ind., which will be needed to extend the line to Muncie, Ind. The road extends from Anderson Junction to Waveland Junction, Ind., 81 miles, with a branch of 19 miles from Sande Creek to Brazil, Ind.

**Chicago, Burlington & Quincy.**—The earnings for August and for the two months ended Aug. 31 were as follows:

August:	1897.	1896.	Inc. or Dec.
Gross earn.	\$3,851,012	\$3,114,267	I. \$736,746
Oper. expen.	2,175,288	1,793,616	I. 381,672
Net earn.	\$1,675,725	\$1,320,651	I. \$355,074
Charges.	890,000	876,202	I. 13,798
Surplus.	\$785,725	\$444,449	I. \$341,276
Two months:			
Gross earn.	\$6,897,072	\$5,867,618	I. \$1,029,454
Oper. expen.	4,131,912	3,573,644	I. 558,268
Net earn.	\$2,765,160	\$2,293,974	I. \$471,186
Charges.	1,780,000	1,752,404	I. 27,596
Surplus.	\$985,160	\$541,570	I. \$443,590

**Chicago, Indianapolis & Chattanooga Southern.**—This company's property was sold at Receiver's sale at Rockport, Ind., Oct. 2, to W. A. Bradford, Jr., of Boston, Mass., for \$300. The company was incorporated some years ago, and the road was graded for 10 miles north of Rockport and trestlework completed to Grand View, costing about \$30,000. It is proposed to complete the building.

**Chicago, Peoria & St. Louis.**—Since Sept. 5 this road has been running passenger trains from Peoria, Ill., into St. Louis, over the tracks of the St. Louis, Chicago & St. Paul, using the Merchants' Bridge over the Mississippi River. Heretofore the trains have run to St. Louis via Jacksonville, Ill. The St. Louis, Chicago & St. Paul, which extends from East St. Louis to Springfield, 1,021 miles, was sold under foreclosure April 3, 1897, bringing it under the control of the owners of the Chicago, Peoria & St. Louis. The company's freight service is now run via Springfield and Waverly. The new train service is the first step in consolidating the interests of the two roads.

**Cleveland, Cincinnati, Chicago & St. Louis.**—The earnings for August and for the two months ended Aug. 31 were reported as follows:

August:	1897.	1896.	Inc. or Dec.
Gross earn.	\$1,250,008	\$1,120,560	I. \$129,448
Oper. expen. and taxes.	963,037	830,726	I. 132,311
Net earn.	\$286,971	\$289,834	I. \$26,737
Fixed charges.	240,273	233,157	I. 7,116
Surplus.	\$56,698	\$56,677	D. \$21
Two months:			
Gross earn.	\$2,349,666	\$2,189,114	I. \$160,552
Oper. expen. and taxes.	1,651,067	1,491,031	I. 160,036
Net earn.	\$698,599	\$698,083	I. \$516
Fixed charges.	478,799	464,717	I. 14,082
Surplus.	\$219,800	\$233,366	D. \$13,566

**Fitchburg.**—At the annual meeting of this company, held at Fitchburg, Sept. 29, the stockholders authorized the directors to issue \$1,450,000 in bonds on such time

and rate as they may determine, to provide for the payment of \$500,000 mortgage notes on the Hoosac Tunnel Dock & Elevator Co., due April 5, 1898, for refunding \$500,000 of six per cent. bonds for the Cheshire Railroad Co., maturing July 1, 1898, and for funding the floating debt.

**Denver & Rio Grande.**—The earnings for August and for the two months ended Aug. 31 were reported as follows:

August:	1897.	1896.	Inc. or Dec.
Gross earn.	\$64,756	\$62,457	I. \$2,299
Oper. expen.	399,498	372,900	I. 26,598
Net earn.	\$285,238	\$251,557	I. \$33,681
Fixed charges.	203,355	200,696	I. 2,659
Surplus.	\$81,883	\$50,861	I. \$31,022
Two months:			
Gross earn.	\$1,383,113	\$1,246,894	I. \$136,219
Oper. expen.	791,691	736,051	I. 55,640
Net earn.	\$591,422	\$510,843	I. \$80,579
Fixed charges.	385,248	381,428	I. 3,820
Surplus.	\$206,174	\$129,415	I. \$76,759

**Erie.**—The earnings for August were as follows:

August:	1897.	1896.	Inc.
Gross earn.	\$3,181,792	\$2,687,666	\$494,126
Oper. expen.	2,218,627	1,825,479	\$393,148
Net earn.	\$963,165	\$862,187	\$100,978

\*One-twelfth of the entire taxes of the year is included.

**Franklin & Megantic.**—Leslie C. Cornish, of Augusta, Me., on behalf of this company, has filed a bill in equity before the court looking to the closing up of its affairs and the eventual foreclosing of the mortgage. The road extends from Strong, Me., to Kingfield, 15 miles.

**Illinois Central.**—This company has leased the Chicago & Texas and the formal transfer was made at 3:30 p. m., Sept. 30. This leased road runs southwest from Johnson City, Ill., crossing the Illinois Central at Carbondale and terminating at East Cape Girardeau, Ill., 73 miles, with a branch from Mobile Junction to Garrison Shaft, two miles. It has also a trackage agreement with the St. Louis, Alton & Terre Haute from Carbondale to Fredonia, Ill., 6.7 miles. By an official circular announcement is made that the jurisdiction of the Illinois Central officials is extended over this road, which is hereafter to be known as the Murphysboro District of the St. Louis Division.

**Lancaster & Strasburg.**—This road, which was withdrawn from sale because of the lowliness of the bid at the recent public sale at Strasburg, Pa. (see this column for last week), has been sold for \$13,000 to F. L. Musselman, of Strasburg, who represents a New York syndicate. The road extends from Strasburg five miles to Leaman Place, where it connects with the Pennsylvania.

**Lehigh Valley.**—The earnings for August and for the nine months ended Aug. 31 were reported as follows:

August:	1897.	1896.	Inc. or Dec.
Gross earn.	\$2,011,174	\$1,827,839	I. \$183,335
Oper. expen.	1,317,624	1,307,981	I. 9,643
Net earn.	\$693,550	\$519,858	I. \$173,692
Nine months:			
Gross earn.	\$13,312,216	\$11,633,659	D. \$1,678,557
Oper. expen.	10,418,742	10,953,765	D. \$535,023
Net earn.	\$2,893,474	\$2,679,894	I. \$213,580

**Louisville & Nashville.**—The earnings for August and for the two months ended Aug. 31 were reported as follows:

August:	1897.	1896.	Inc. or Dec.
Gross earn.	\$1,778,103	\$1,650,788	I. \$127,315
Oper. expen.	1,183,837	1,196,271	D. 12,434
Net earn.	\$594,266	\$454,517	I. \$139,749
Two months:			
Gross earn.	\$3,573,560	\$3,278,388	I. \$295,172
Oper. expen.	2,351,572	\$2,317,872	I. 33,700
Net earn.	\$1,221,988	\$960,516	I. \$261,472

**Memphis & Charleston.**—The coupons due Jan. 1, 1895, upon the following named bonds will be paid on and after Oct. 1 at the Chase National Bank, with interest at six per cent. from the date of maturity. These bonds are first and second extension seven per cents., dated 1854, extended to 1880; second mortgage seven per cents., due Jan. 1, 1885, renewed; first mortgage Tennessee Division 40-year seven per cents.; consolidated mortgage 40-year seven per cents.

**Mexican Central.**—The earnings for August and for the eight months ended Aug. 31 were reported as follows:

August:	1897.	1896.	Inc. or Dec.
Gross earn.	\$1,004,965	\$838,626	I. \$166,339
Oper. expen.	834,420	532,602	I. 301,818
Net earn.	\$170,545	\$306,024	D. \$135,479
Eight months:			
Gross earn.	\$8,526,384	\$6,533,424	I. \$1,992,960
Oper. expen.	5,911,013	4,197,291	I. 1,713,722
Net earn.	\$2,615,371	\$2,336,133	I. \$279,238

It is stated that the increased expenses for August, 1897, are due to repairs caused by washouts and to higher rates of exchange on U. S. currency owing to the decline in silver.

**Middle Tennessee & Alabama.**—The Board of Directors of the Nashville, Chattanooga & St. Louis, has authorized President Thomas to purchase this road at a price not named. (See this column for May 14.) The road was sold under foreclosure at Fayetteville, Tenn., May 5, to J. W. Dickson, Receiver of the St. Louis, Chicago & St. Paul, for \$150,000. The line is projected from Decatur, Ala., to Shelbyville, Tenn., 78 miles, and has been completed from Bondville, Tenn., to the Alabama state line, 34 miles. The company was organized in 1893 as successor to the Decatur, Chesapeake & New Orleans. It is probable that an extension of the road will be built by the Nashville, Chattanooga & St. Louis.

**Norfolk & Western.**—The earnings for August and for the two months ended Aug. 31 were as follows:

August:	1897.	1896.	Inc. or Dec.
Gross earn.	\$1,011,571	\$880,078	I. \$131,493
Oper. expen.	663,535	685,343	D. 21,808
Net earn.	\$348,036	\$194,735	I. \$153,301
Two months:			
Gross earn.	\$1,903,980	\$1,762,802	I. \$141,178
Oper. expen.	1,290,134	1,356,093	D. 65,959
Net earn.	\$613,846	\$406,709	I. \$207,137

**Philadelphia & Brigantine.**—The lease of this road to the Atlantic City, a branch of the Philadelphia & Reading, expired Sept. 30, and it will hereafter be operated by the stockholders. This narrow-gage road



runs from Brigantine Junction, N. J., southeast 14 miles, through Atlantic County to Brigantine Beach.

**Pennsylvania.**—The earnings for August and for the eight months ended Aug. 31 were reported as follows:

	1897.	1896.	Inc. or Dec.
Gross earn.	\$5,729,690	\$5,191,460	I. \$538,230
Oper. expen.	3,529,047	3,347,047	I. 182,000
Net earn.	\$2,200,643	\$1,844,413	I. \$356,230
Eight months:			
Gross earn.	\$19,716,224	\$19,671,924	I. \$44,300
Oper. expen.	28,655,977	30,285,727	D. 1,629,800
Net earn.	\$12,060,297	\$10,386,197	I. \$1,674,100

**Southern Pacific.**—The earnings for August and for the two months ended Aug. 31 were reported as follows:

	1897.	1896.	Inc. or Dec.
Gross earn.	\$1,888,615	\$1,135,525	I. \$753,090
Oper. expen.	2,781,743	2,504,091	I. 277,652
Net earn.	\$2,106,872	\$1,651,431	I. \$455,441
Two months:			
Gross earn.	\$9,410,257	\$7,973,053	I. \$1,437,204
Oper. expen.	5,489,876	5,094,128	I. 395,748
Net earn.	\$3,920,381	\$2,878,925	I. \$1,041,456

**Union Pacific.**—Special Master W. D. Cornish, under date of Aug. 24, has advertised the foreclosure sale in one parcel of all the property covered by the government subsidy mortgage, to take place at Omaha, Neb., Nov. 1 at 11 a. m. The sale includes the whole line of railroad and telegraph, with all the rolling stock, real estate and other property, and is subject only to the prior first mortgage. Each bidder is required to deposit \$2,000,000 cash five days before the sale. The upset price is \$23,000,000. Cash to the amount of 15 per cent. of the bid must be paid within five days of the sale. The remainder must be paid, 25 per cent. within 30 days of the confirmation of the sale, 25 per cent. within 40 days of the confirmation, 25 per cent. within 50 days and 25 per cent. within 60 days. The bonds held in the U. S. Union Pacific sinking fund constitute one parcel, the sale of which may be postponed from day to day by the Special Master. The upset price is \$13,645,250.89, and all bidders must deposit one-tenth of this sum within five days of the sale. Full payment must be made within 15 days following the sale. The sale of the property included in the first mortgage (identical with that under the second mortgage) is advertised to take place at Omaha, Nov. 2, at 11 a. m. The upset price is \$50,637,435, and deposits and payments are on the same terms as under the second mortgage.

The New England Trust Co., of Boston, as trustee under the Union Pacific collateral trust five per cent. mortgage of 1883, has filed a bill in equity asking for the foreclosure of the deed of trust upon which interest is in default and the sale of the following securities: Colorado Central first mortgage seven per cents, \$1,000,000; Omaha & Republican Valley first mortgage seven per cents, \$573,000; consolidated mortgage five per cents, \$1,800,000; Utah & Northern first mortgage seven per cents, \$1,869,000; Utah Southern extension first mortgage seven per cents \$79,000, making a total of \$5,499,000.

The reorganization committee, of which Louis Fitzgerald, New York, is Chairman, calls upon holders of certificates to pay to the Mercantile Trust Co., New York, the second installment of five per cent. of the nominal value of the certificates before Oct. 20.

The Kansas Division, formerly known as the Kansas Pacific, is advertised to be sold at Topeka, Kan., Nov. 4, at 11 a. m. in foreclosure of the government subsidy mortgage. The road extends east and west across Kansas 394 miles, and is sold subject to first mortgage liens.

**Union Pacific, Denver & Gulf.**—It is stated on the authority of Receiver Trumbull that a syndicate with strong financial backing headed by Hallgarten & Co., and J. Kennedy Tod & Co., of New York, purchased several weeks ago from J. Pierpont Morgan & Co., trustees of the Union Pacific collateral trust of 1893, \$13,000,000 of stock and \$6,500,000 of consol bonds, a total of \$19,500,000. Additional proxies have been obtained giving this syndicate control of the road. The syndicate has appointed a Reorganization Committee consisting of J. M. Dodge, Chairman; W. Hermann, H. Lewis, Oliver Ames, George M. Hallman, Henry Bridge and J. Kennedy Tod. It is thought that three months will be required to complete the plan of reorganization and that six months more will be required to put it into effect, so that the new company will not take possession before July 1, 1898.

**Wheeling & Lake Erie.**—It is announced that the Stockholders' Committee, headed by Dick Bros. & Co., (see this column for Sept. 17) has secured a large majority of both the common and preferred stock. The committee will direct its first efforts toward preventing foreclosure and will then join with the Fitzgerald Committee in announcing a plan of reorganization. Further deposits of stock will be received until Oct. 15 upon a payment of a penalty of one-half of one per cent. After that date no stock will be received.

**Wisconsin Central.**—An Improvement Bonds Committee, consisting of T. Jefferson Coolidge, Chairman, Ames Building, Boston; Charles R. Batt, National Security Bank, Boston, and William Pratt Lyman, 4 Post Office Square, Boston, requests the immediate deposit of the improvement bonds of this company with the Farmers' Loan & Trust Co., of New York, or the Old Colony Trust Co., of Boston. These bonds are five per cent. gold improvement bonds issued in 1891, \$3,642,122 outstanding.

#### Electric Railroad News.

**Bridgewater, Mass.**—The Massachusetts Railroad Commissioners have approved the issue of \$85,000 bonds by the Bridgewater, Whitman & Rockland electric road, providing that no more than \$16,000 shall be used for building track and roadbed, \$31,000 for constructing the overhead system, \$26,500 for purchase of equipment and rolling stock, and \$11,500 for land and a car house.

**Brooklyn, N. Y.**—The passenger receipts of the Brooklyn Rapid Transit Co. for the month of September were \$30,921 more than for the same month last year. The receipts from miscellaneous sources were somewhat less, making the net showing for September and for the first three months of the present fiscal year as follows:

	1897.	1896.
September:		
Brooklyn Heights R. R. Co.	\$110,516	\$386,439
Brooklyn, Queens Co. & Suburban R.R. Co.	68,314	65,073
Total	\$178,830	\$451,512
Three months ending Sept. 30:		
Brooklyn Heights R. R. Co.	\$1,257,442	\$1,210,180
Brooklyn, Queens Co. & Suburban R.R. Co.	206,289	214,064
Total	\$1,463,731	\$1,424,244

On Tuesday of this week the Board of Directors of the Brooklyn Heights Railroad Co. ratified the lease to the Trustees of the Brooklyn Bridge of a triangular piece of ground, adjoining the Liberty Street Plaza, which has heretofore hindered the electric companies in laying the tracks on the Bridge roadway. Until this action was taken the officials of the Bridge could not issue a permit for the railroad company's men to begin work on the crossings.

**Chicago.**—Contracts have been signed between the four elevated railroad companies and the Union Elevated Railroad Co. for running the elevated cars of the roads around the loop, in the business section of the city, and the Lake street trains commenced running around the circuit Sunday, Oct. 3. The connection with the Metropolitan West Side Elevated is nearly completed and it is expected that the Metropolitan trains will first use the Loop about the middle of October. The work of connecting the South Side Elevated through Harrison street has not been commenced, and it will be several weeks before the Alley L. trains will make the complete circuit. The Loop will be under the control of a Board of Managers consisting of the presidents of the four elevated roads. A superintendent who will report direct to the Board will have immediate charge of the structure, power-house, and the operation of the trains. The terms of the contract require all the roads to pay one-half a cent for every passenger carried, with a minimum guaranteed income of \$250,000. The only expense devolving on the "Union Loop" Company is the interest on its bonds, the land or property claimed, or damages arising from the erection of buildings. The contract makes provision for all the complications that might arise. For detailed information see previous articles in *Railroad Gazette*.

**Cleveland, O.**—On Oct. 3 a bill of equity was filed by Frank Robinson, who seeks an injunction and the appointment of a Receiver for the Cleveland City Railway Co. The defendants in the case are Messrs. J. J. Shipperd, M. A. Hanna, J. B. Hanna, the Citizens' Saving & Loan Association, the National Bank of Commerce, the Union National Bank, the Euclid Avenue National Bank, William C. Stable and the Cleveland City Railway Co. Judge Walter C. Ong has issued a temporary restraining order, but has not as yet passed on the receivership question. On Oct. 4 Mr. Shipperd was arrested on a charge of embezzling money to the amount of \$1,250,000, intrusted to his care. He was released on \$20,000 bail to appear at the hearing Oct. 18.

**Easton, Pa.**—Albert C. Rodenhough, of the Easton Transit Co., succeeds Fletcher H. Knight as manager.

**Lock Haven, Pa.**—On Sept. 30 William B. Given, of Columbia, Pa., was appointed Receiver of the Lock Haven Traction Co. The request was made by bondholders representing \$143,500 and in compliance thereof the West End Trust Co., of Philadelphia, asked for a foreclosure. Mr. Given has filed a bond of \$10,000 and assumed control of the road. The funded debt of the company is \$150,000.

**Nantasket, Mass.**—A hearing will be given on Oct. 11 by the Railroad Commissioners in the matter of the lease of the Nantasket electric road to the Hingham electric road.

**New York.**—The report of the Metropolitan Street Railway Co. for the year ending June 30 which was filed with the Railroad Commission last week, gives the following figures: Gross earnings, \$8,888,804; operating expenses, \$4,810,235; net earnings, \$4,078,569; other income, \$547,539; fixed charges, \$3,186,975; net income, \$1,439,122; four per cent. dividend declared on \$30,000,000, amounting to \$1,200,000; total surplus, \$1,332,488; cash on hand, \$295,013; number of passengers carried, including transfers, 294,705,704; transfers issued, 56,929,611. The net earnings of the company for the year were increased by \$98,690 as the result of interest on investments by the Metropolitan Street Railway Co. formerly paid into the treasury of the Metropolitan Traction Co. During the year 16 passengers were injured and two killed; two employees were injured and two killed, while 19 persons not passengers or employees were injured and eight killed.

**Pittsburgh, Pa.**—Mr. B. F. Jones, of Pittsburgh, succeeds E. C. Gibson, of New York, as a director of the Consolidated Traction Co.

**Webster, Mass.**—The Webster & Dudley Street Railway Co. has sold nearly all of its capital stock of \$50,000. No construction work has been begun, nor has a franchise been asked for. The proposed road is seven miles long, and it is expected that steps will be taken for building the line very soon.

#### TRAFFIC.

##### Traffic Notes.

The Railroad Commissioners of Illinois have called upon the principal railroads to explain why they do not use the Western freight classification, in cases where it is lower than the Illinois classification, as required by a rule of the Commission.

The Cincinnati, Hamilton & Dayton announces that the new interchangeable mileage ticket is good on all through trains of the Cincinnati, Hamilton & Dayton and the Chicago, Indianapolis & Louisville between Cincinnati and Chicago, in both directions.

A new freight bureau is reported in Denver, Col. The merchants of that city have maintained a bureau for a considerable share of the time for several years past, but at last accounts they were unable to raise enough money to keep the establishment alive.

A Topeka paper reports that the Atchison, Topeka & Santa Fe and the Missouri, Kansas & Texas now charge for bulky freight by the cubic foot instead of by estimated weights as formerly, and the State Railroad Commissioners are reported as greatly surprised at this innovation, made without their advice or consent.

The Massachusetts State Railroad Commissioners have approved the schedules of Sunday trains of the Boston & Maine and New York, New Haven & Hartford Railroads, with the usual proviso that they shall not be in whole or in part excursion trains, and that fares shall not be less than those regularly charged on weeks days. The approval continues in force until July 1, 1898, and all previous permits are revoked.

General Orland Smith, representative of the Baltimore & Ohio in the Board of Managers of the Joint Traffic Association, has retired from the position of representative for that company and has become the representative of the Lehigh Valley. Mr. Garrett, of the latter company, retires for the purpose of giving his whole time to the management of the traffic department of the road, and Mr. Smith's successor as representative of the Baltimore & Ohio is George F. Randolph.

The semi-weekly fast train of the Atchison, Topeka & Santa Fe from Chicago to Los Angeles, which was run last winter, will be resumed on or about Oct. 20. The train will have a sleeping car to and from St. Louis over the Wabash, as heretofore. It is stated in the newspapers that the Sunset Limited of the Southern Pacific, which has heretofore run twice a week in the winter between New Orleans and San Francisco, will this season be run to and from Chicago in consequence of the yellow fever difficulties at New Orleans. The train will run over the Chicago & Alton, the St. Louis, Iron Mountain & Southern and the Texas & Pacific.

In connection with the statistics of the cotton crop, published in the *Railroad Gazette* of Sept. 17, it is of interest to note that an increasing proportion of the cotton raised in the United States is consumed by mills in the Southern States; that is to say, within a short distance of the fields. The annual report of the Secretary of the New Orleans Cotton Exchange states that during the last crop year the number of bales of cotton consumed by mills in the Southern States was 1,042,671, an increase of 137,970 bales over the preceding year and almost double the quantity used eight years ago. Of the 3,562,811 spindles in the Southern States only 143,148 are now reported as idle. The number of spindles at work is 463,267 more than a year ago.

Commissioner Knapp, of the Interstate Commerce Commission, took testimony in New York City on Oct. 1 and 2 in the complaint of the American Warehouse Men's Association concerning free storage of freight by the railroad companies. Evidence was given by local representatives of the Pennsylvania, the Central of New Jersey, the Delaware, Lackawanna & Western, the West Shore and the Erie roads. In general the witnesses admitted giving free storage on various commodities, low-class goods being stored in some cases several weeks or months. The only class of freight on which there was a formal agreement to allow free storage was flour. Flour for export is allowed longer free storage than that for domestic delivery, and it appeared that in exceptional cases flour billed for export was changed to domestic delivery, but witnesses averred that in such cases the local delivery time-limit was enforced. The agent of the Erie stated that about \$4,000 had been collected for storing flour at the Weehawken piers of that company in one year, and about \$800 for similar storage at the company's main pier.

#### Michigan Mileage-Ticket Law Sustained.

The case of Smith against the Lake Shore & Michigan Southern, which has been pending in the Michigan Supreme Court for more than a year, has been decided, a majority of the court holding constitutional the act of 1891 requiring all companies operating in Michigan to sell 1,000-mile tickets, good for any member of the purchaser's family, and valid for two years from date of purchase, the price to be \$20 in the lower counties and \$25 in the upper Peninsula. The court denies the company's contention that the law affects interstate commerce, that it is an attempt to compel railroads to enter into contracts to be performed in the future, and is, therefore, an invasion of the right to the use of property and in violation of the Federal Constitution that no person shall be deprived of property without due process of law; that it is invalid, and that the constitutional amendment reserving the right to alter and amend charters was adopted after the original charter was granted for the road in 1846, and the law, therefore, impairs the obligation of contracts.

With reference to the Lake Shore's original charter, the court says that the company by its consolidation under an act passed since the enactment of the Constitution reserving the right to alter, amend or repeal, is subject to the general control of the Legislature. The main opinion was concurred in by Justices Montgomery, Long and Moore, Justices Grant and Hooker dissenting.

#### Chicago Traffic Matters.

CHICAGO, Oct. 6, 1897.

Interchangeable mileage continues to be a question of lively interest in both Eastern and Western passenger circles. Although the Western lines have adopted the Sebastian ticket, to go into use Nov. 1, the commercial travelers have already begun to grow about many of its features. The regulations for the use of the Central passenger interchangeable mileage ticket are also to be remodeled in some respects, and the Eastern roads are meeting to-day to act on contemplated changes.

Roads in the Western Passenger Association have agreed to restore rates and commissions in eastern committee territory east of the Missouri River and St. Paul. Efforts to restore rates west of the river failed because the Union Pacific refused to become a party to any compact until the Oregon Short Line matter is definitely fixed up.

All eastbound lines from St. Louis have agreed that all tariff rates shall be maintained after Oct. 15. This will clear the freight rate situation through the Chicago gateway.

The annual meeting of the lines parties to the Western Pass Agreement to draw the pass agreement for 1898, has been called to meet in St. Louis, Oct. 26.

Executive officers of the Western roads decided at a meeting held last week to restore all freight rates to published tariff on Oct. 15.

The Chicago-St. Paul lines, in connection with the Grand Trunk, have announced a 40-cent rate on potatoes from St. Paul and Minneapolis to Boston via Chicago, to meet Soo competition.

The rate on corn by lake to Buffalo is 1¼ cents a bushel.

Eastbound shipments from Chicago and Chicago junctions to points at and beyond the Western termini of the trunk lines for the week ending Sept. 30 amounted to 57,331 tons, as compared with 55,092 tons the preceding week. This statement includes 19,002 tons of grain, 3,309 tons of flour and 12,659 tons of provisions, but not live stock. The following is the statement in detail for the two weeks:

Roads.	WEEK ENDING SEPT. 30.		WEEK ENDING SEPT. 23.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio	3,915	6.8	3,299	6.0
C., C. & St. Louis	4,477	7.8	2,908	5.3
Erie	5,408	9.4	5,179	9.4
Grand Trunk	6,633	11.6	7,195	13.1
L. S. & M. S.	2,636	9.8	6,387	11.5
Michigan Central	6,095	10.6	6,040	11.0
N. Y., Chi. & St. L.	5,413	9.5	4,783	8.7
Pitts., Cin. Chi. & St. Louis	4,413	7.7	3,667	6.6
Pitts., Ft. Wayne & Chicago	9,659	16.9	9,831	17.8
Wabash	5,662	9.9	5,823	10.6
Totals	57,331	100.0	55,092	100.0

Lake shipments last week were 127,102 tons.